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TRANSCRIPT OF RECORD

Government Exhibits

VOLUME XIII.

IN THE

DISTRICT COURT OF THE UNITED STATES

For the District of New Jersey

United States of America

vs.

United States Steel Corporation and Others

HD
2786
S85
US
v.43

A.297854
X

UNITED STATES

vs.

UNITED STATES STEEL CORPORATION.

GOVERNMENT EXHIBITS,

Volume XIII.

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Government Exhibit (Schwab) No. 426
May 20, 1913

EXPORTS OF IRON AND STEEL.

The following table, also compiled from the reports of the Bureau of Statistics of the Treasury Department, gives our exports of leading articles of iron and steel and of iron ore and locomotives in the calendar years 1899, 1900, 1901, and 1902.

Exports--Gross tons.	1899	1900	1901	1902
Pig iron..............................	228,678	286,687	81,211	27,487
Scrap and old, for remanufacture....	76,663	49,328	14,199	9,411
Bar iron..............................	10,898	13,299	17,708	22,249
Band, hoop, or scroll iron and steel	2,869	2,976	1,561	1,674
Bars or rods of steel not wire rods.	30,429	81,366	27,397	9,300
Steel wire rods.......................	16,992	10,652	8,165	24,613
Billets, ingots, and blooms.........	25,487	107,385	28,614	2,409
Cut nails and spikes.................	9,974	11,163	9,302	7,170
Wire nails............................	33,517	27,404	18,773	26,580
All other nails, including tacks....	2,076	1,812	1,896	2,244
Iron plates and sheets...............	6,196	9,331	6,909	3,434
Steel plates and sheets..............	50,635	45,534	23,923	14,866
Iron rails............................	6,442	5,374	901	211
Steel rails...........................	271,272	356,245	318,055	67,455
Structural iron and steel............	54,244	67,714	54,005	53,859
Wire..................................	116,317	78,014	88,238	97,843
Total of the above iron and steel	942,689	1,154,284	700,857	370,805
Iron ore..............................	40,665	51,460	64,703	88,445
Locomotives...................Number	484	436	448	368

Our total exports of iron and steel. which include locomotives, car wheels, machinery, castings, hardware, saws and tools, sewing machines, stoves, printing presses, boilers, etc., amounted in the calendar year 1902 to $97,892,036, against $102,534,575 in 1901, $129,633,480 in 1900, $105,690,047 in 1899, $82,771,550 in 1898, and $62,737,250 in 1897. Our exports of iron and steel more than doubled in value from 1897 to 1900, but there was a shrinkage in 1901 as compared with 1900 of $27,098,905, or over 20 per cent. In 1902 there was a further shrinkage, but it was not so pronounced as in 1901, owing largely to the advance in prices. The decline in our exports of iron and steel in 1902 as compared with 1901 was partly due to the active demand for these products at home and partly to lower prices abroad.

Government Exhibit (Gary) No. 428.

June 3, 1913.

B 4800
B 4795
Supplemental
Agreement # 1.

AMERICAN BRIDGE COMPANY OF NEW YORK,
Hudson Terminal,
30 Church Street, New York.

C. W. Bryan,
Division Contracting Manager.

E. B. Stearns,
Assistant Division Contracting Manager.

FEBRUARY 4, 1909.

MR. W. V. S. THORNE,
Director of Purchases,
120 Broadway, New York.

DEAR SIR:

Referring to our proposition to you dated July 28th, 1908, in regard to furnishing to the Union Pacific Railroad Company, Oregon Short Line Railroad Company, the Oregon Railroad and Navigation Company, Southern Pacific Company, Northwestern Pacific Railroad Company, San Pedro, Los Angeles and Salt Lake Railroad Company, Southern Pacific Company's Atlantic Steamship Lines, and the Pacific Mail Steamship, or any of their present or future associated or proprietary companies, such steel structures as they may desire to purchase from us, we would say that the manner in which we receive orders for Steel Railway Structures at the present time, does not enable us to put the work through our shops to the best advantage, as the orders come to us from the different local Purchasing Agents at different times, and in comparatively small quantities: If these orders could be concentrated to a greater extent, so as to enable us to build similar Structures, as far as is conveniently practicable, at the same time it would conduce to economy in producing such

Structures, and at the same time enable the work to pass through our shops with greater facility.

As an inducement to the Associated Lines to assist us along these lines and concentrate orders for the different lines, and for the same line where practicable, we would say that in any months, until further written notice from us to the contrary, in which the Associated Lines will place with us orders for Steel Railway Structures exceeding in the aggregate 3000 net tons per month, regardless of the actual time shipment is wanted, providing it is not to exceed eight (8) months after date of placing the order, we would be willing until further notice, to make a concession of 5% below the prices now named in Agreement No. 1-136, as outlined in our proposition to you dated July 28th, 1908.

It seems to us that if Mr. J. D. Isaacs, Consulting Engineer, could instruct the local Purchasing Agents concerned, from time to time, in regard to when they should place orders with us for such Steel Railway Structures as might be required, or if such orders could come to Mr. J. D. Isaacs' office and be distributed to us by him in order to accomplish this result, there should be no difficulty about the Railroad Companies co-operating in this matter and thereby availing of the advantages offered, and at the same time accommodate our Company.

Please acknowledge receipt of this supplementary proposition, and advise if you will notify the officials concerned accordingly, and ask them to consider it as Supplement No. 1 to Agreement No. 1-136 between the American Bridge Company of New York and the Associated Lines, in regard to furnishing Steel Railway Structures.

Yours very truly,
DIVISION CONTRACTING MANAGER.

P.

(Time stamp on back of letter)
Received
Apr 23 1909
Auditing-Billing.

Government Exhibit (Gary) No. 429.

June 3, 1913.

B 4800
B 4795

Subject: Supplement No. 1 to Agreement for furnishing Steel Railway Structures.

Union Pacific Railroad Company,
Oregon Short-Line Railroad Company,
The Oregon Railroad and Navigation Company,
Southern Pacific Company.

Office of Director of Purchases,
120 Broadway,
New York City.

Please refer to file
No. 1-136.

New York, N. Y., February 10th, 1909.

American Bridge Company of New York,
c/o Mr. C. W. Bryan, Division Contracting Manager,
Hudson Terminal, 30 Church St.,
New York, N. Y.

Dear Sirs:—

I have your letter of February 4th, 1909, in regard to a special reduction in prices of Steel Railway Structures, which your Company would be willing to furnish to the Union Pacific Railroad Company, Oregon Short Line Railroad Company, The Oregon Railroad & Navigation Company, Southern Pacific Company, Northwestern Pacific Railroad Company, San Pedro, Los Angeles & Salt Lake Railroad Company, Southern Pacific Company's Atlantic Steamship Lines, and the Pacific Mail Steamship Company, or any of their present or future associated or proprietary companies, in case they arrange to place with your company during any month, until further notice from your company, orders aggregating 3,000 net tons of such material for the reasons mentioned in your letter.

I am much obliged for this concession and I will send copies of this correspondence to each of the officials concerned of the Railroad and Steamship Companies mentioned, for their information and files, and will ask them to hereafter endeavor to concentrate their orders in such a manner as you suggest by communicating with Mr. J. D. Isaacs, Consulting Engineer, as to the months in which they should place with your company orders for whatever material they may need, and trust that this arrangement may be found to work without difficulty to the best satisfaction of all concerned.

I will ask the officials of the Associated Lines to consider this correspondence as Supplement No. 1 to Agreement No. 1-136 between your company and the Associated Lines in regard to furnishing Steel Railway Structures.

Yours truly,
W. V. S. THORNE.

T-F

(Rubber stamp)
Received
Mailing Division
Feb 11 1909
American Bridge Co.
of New York.

(On back of letter)

(Time stamp)
Received
Apr 23 1909
Auditing-Billing.

B 4795
B 4800
Supplemental
Agreement # 1.

B 4800
B 4795
Supplemental
Agreement # 2.

Subject: Supplement No. 2 to Agreement for furnishing Steel Railway Structures.

Union Pacific Railroad Company,
Oregon Short Line Railroad Company,
The Oregon Railroad and Navigation Company,
Southern Pacific Company.

Office of Director of Purchases,
120 Broadway,
New York City.

Please refer to file
1-136.

New York, March 3rd, 1909.

American Bridge Company of New York,
c/o Mr. E. B. Stearns,
Asst. Division Contract Manager,
30 Church St., New York, N. Y.

Dear Sirs:—

I am much obliged for your supplementary letter dated March 1st, 1909, quoting reduced prices on Steel Railway Structures, and supplementing your propositions to me dated July 28th, 1908, and February 4th, 1909, in regard to furnishing to the Union Pacific Railroad Company, Oregon Short Line Railroad Company, The Oregon Railroad and Navigation Company, Southern Pacific Company, Northwestern Pacific Railroad Company, San Pedro, Los Angeles & Salt Lake Railroad Company, Southern Pacific Company's Atlantic Steamship Lines, and the Pacific Mail Steamship Company, or any of their present or future associated or proprietary companies, such Steel Railway Structures of the kinds mentioned, as they may desire to purchase from your Company.

I will send copies of this supplementary correspondence to each of the officials concerned of the Railroad and Steamship Companies mentioned, for their information and files, and will ask them to consider it as Supplement No. 2 to Agreement No. 1-136.

Yours truly,
W. V. S. THORNE, JR.

T-R

(Rubber stamp)
Received
Mailing Division
Mar 4 1909
American Bridge Co.
of New York.

(On back of letter)

(Time stamp)
Received
Apr 23 1909
Auditing-Billing.

B 4800
B 4795

NEW YORK, MARCH 1, 1909.

MR. W. V. S. THORNE,
Director of Purchases,
120 Broadway, New York City.

DEAR SIR:

Supplementing our propositions to you dated July 28, 1908, and February 4, 1909, in regard to furnishing to the Union Pacific Railroad Company, Oregon Short Line Railroad Company, The Oregon Railroad and Navigation Co., Southern Pacific Company, Northwestern Pacific Railroad Company, San Pedro, Los Angeles & Salt Lake Railroad Company, Southern Pacific Company's Atlantic Steamship Lines, and the Pacific Mail Steamship Company, or any of their present or future associated or proprietary Companies, such Steel Railway Structures of the kinds mentioned on Schedule "A" dated July, 1908, as they may desire to purchase from us, we would say that on account of the fact that on March 1st, 1909, the price of tank plates, beams and angles f. o. b. Pittsburgh, Pa., was reduced from $1.60 to $1.30 per one hundred pounds, we will, on orders placed with us during the month of March, and until further notice from us to the contrary, furnish Steel Railway Structures of the kinds mentioned on Schedule "A" at prices which are to apply when the average price of tank plates, beams and angles f. o. b. Pittsburgh, Pa., is $1.30 per one hundred pounds.

It is understood that all other terms and conditions as outlined in our letters of July 28th, 1908, and February 4th, 1909, are to remain unchanged and to apply where applicable.

Please acknowledge receipt of this supplementary letter, and advise if you will notify the officials of the Railroad and Steamship Companies concerned accordingly, and ask them to consider this letter as Supplement No. 2 to Agreement No. 1-136 between the American Bridge Company of New York and the Associated Lines.

Yours very truly,

ASS'T DIVISION CONTRACTING MANAGER.

P.

(On back of letter)

(Time stamp)
Received
Apr 23 1909
Auditing-Billing.

B 4795
B 4800
Supplemental
Agreement # 2.

Government Exhibit (Gary) No. 430.

June 3, 1913.

B 4795
B 4800

AMERICAN BRIDGE COMPANY OF NEW YORK,
30 Church St., New York, N. Y.

JULY 7, 1909.

MR. W. V. S. THORNE,
Director of Purchases,
120 Broadway, New York City.

DEAR SIR:

I have your letter of June 21st enclosing copy of letter from Mr. Isaacs, Consulting Engineer, dated June 17th, and note that Mr. Isaacs asks you to see whether the American Bridge Company cannot be made to assume a more reasonable and accommodating attitude in handling work and that you ask us to live up to our agreement.

We regret that Mr. Isaacs feels as he does, but we believe the shoe is on the other foot. We certainly intend to accommodate you all we can. One point in the agreement which you and Mr. Isaacs seem to have overlooked is, "that providing we are given reasonable notice in advance as to what the requirements of the Railroad Companies concerned are, we are to make deliveries at such points as may be most favorable to the Railroad Company." I may say that in no instance have we ever had an advance notice. We cannot undertake to leave open a large percentage of the capacity of a plant without any assurance whatever that we will have any orders from you to fill up on.

The three contracts which Mr. Isaacs mentions were all for quick delivery, no advance notice being given us, and we felt that we were accommodating you by assigning them to plants which could approximate the shipments desired. You are probably aware that very recently there has been an unusual demand on our capacity, and without advance notice of your requirements, we are trying to give you the best service possible.

There are, altogether, about 550 tons assigned to other points than Ambridge and which we expect to deliver to you at Chicago at Chicago rate, less the 5 per cent special discount which we were to give you for monthly tonnages running over 3,000 tons. Mr. Isaacs claims that we should either deliver to you at Ambridge, or charge Ambridge prices for the other delivery points. This we cannot agree to.

We would appreciate it if you would impress on your various people that we will make the deliveries at such points as they desire, if they will only give us the advance notice that the agreement requires, so that it will be possible for us to run our shops in a practical way.

Yours very truly,

DIVISION CONTRACTING MANAGER.

P.

(The above letter is a typewritten carbon copy on paper which has the word "Copy" printed across the letter.)

(On back of letter)

(Time stamp)
Received
Aug 2 1909
Auditing-Billing.

Government Exhibit (Gary) No. 431.

June 3, 1913.

B 4795
B 4800

Subject: Steel Railway Structures.

Union Pacific Railroad Company,
Oregon Short Line Railroad Company,
The Oregon Railroad and Navigation Company,
Southern Pacific Company.

Office of Director of Purchases,
120 Broadway,
New York City.

Please refer to file
1-136.

NEW YORK, N. Y., JUNE 21, 1909.

AMERICAN BRIDGE COMPANY, OF NEW YORK,
c/o Mr. C. W. Bryan, Division Contracting Manager,
30 Church Street, New York, N. Y.

DEAR SIRS:

I enclose for your information copy of letter dated June 17, 1909, from Mr. John D. Isaacs, Consulting Engineer, to me.

It seems to me that Mr. Isaacs' contention in this connection is absolutely correct. If you refer to Agreement No. 1-136 between your Company and our Associated Lines, as outlined in your proposition to me dated July 28, 1908, you will notice the following clauses:

"We will furnish Steel Railway Structures under the terms of this agreement at the prices and points of delivery mentioned on Schedule A, dated July, 1908, attached hereto.

In case we should in future fabricate Steel Railway Structures at other points than those mentioned on Schedule A, which are more favorably located as regards point of delivery for Steel Railway Structures destined for some of the Companies referred to above, we would likewise be willing to furnish Steel Railway Structures referred to at such other point of manufacture at prices equally as low considering the cost of manufacture at such point.

It is understood that providing we are given reasonable notice in advance as to what the requirements of each of the Railroad Companies concerned are to be, we are to make deliveries of Steel Railway Structures ordered under this agreement at such points of delivery and at prices indicated on Schedule A, as may be most favorable for the Railroad Company concerned and as may be designated by such Railroad Company on orders.

It is understood, however, that we reserve the right to fabricate any of this material at any of our other shops to which we may prefer to assign it."

As you will note the Agreement seems to be quite clear in regard to this matter, I would like to ask if I cannot advise Mr. Isaacs that your Company will live up to the terms of the Agreement.

Yours truly,
W. V. S. THORNE.

Copies to

Mr. John D. Isaacs, Consulting Engineer, Chicago, Ill., and

Mr. I. O. Rhoades, Gen. Pur. Agt., S. P. Co., San Francisco, Cal., for their information.

(On back of letter)

(Time stamp)
Received
Aug 2 1909
Auditing-Billing.

Government Exhibit (Gary) No. 432.

June 3, 1913.

B 4795
B 4800

Union Pacific System,
Southern Pacific Company.

Copy.

Chicago, Ill., June 17, 1909.

Mr. W. V. S. Thorne,
Director of Purchases,
120 Broadway, New York, N. Y.

Dear Sir:

Referring to our contract with the American Bridge Company made by you, accompanying your letter of August 3, 1908:

Under the terms of that contract we have a right to designate our points of delivery, and the Bridge Company is required to bill against us at the contract prices for such designated points, they reserving the right to fabricate at any other shop to which they may prefer to assign it. They now assume the position that they can assign it to any of their shops they please and charge us contract delivery price accordingly, or keep us waiting what appears to us to be an unreasonable time for delivery if we insist upon deliveries as designated in our requisitions.

It appears to me that the purpose of giving us an option as to points of delivery was for our benefit and convenience. The stand taken by the Bridge Company in this case practically abolishes such privilege, and there is no purpose, so far as we are concerned, in having divers points of delivery, if such position is sustained.

There has been a good deal of correspondence over this, with the details of which it is unnecessary to burden the correspondence at this time, but among the others I quote from a letter of Mr. I. O. Rhoades to me of June 10th, as follows:

"Question as to point of delivery was taken up with Mr. Thorne a long time ago, and I think he decided that American Bridge Company should furnish material according to point of delivery we named on our orders, and furnish it promptly."

This certainly appears to me to be a sound statement of our rights in the matter as I understand the contract and its intent.

Merely as an instance in this matter I am in receipt of a letter from Mr. C. W. Bryan, Division Contracting Manager of the American Bridge Company, dated New York, June 8, in which he notifies me that the President of their Company has arbitrarily assigned our orders, all of which were designated as Ambridge delivery, as follows:

Antelope Creek	Toledo
Auburn Ravine Viaduct	Western Division
110′ C. S. Riveted Truss Bridge, Sacramento	Western Division

and on these Mr. Bryan claims Chicago prices; the alternative to which appears to be that we will be obliged to wait an unreasonable time for delivery unless this assignment is accepted.

The purpose of this letter is to ask you if you cannot get the American Bridge Company, with whom the contract was made by you, to assume a more reasonable and accommodating attitude in handling this work for us. We do not want to inconvenience them or insist upon unreasonable requirements, but we do think that we should exercise the privileges accorded to us by the contract with them without having unreasonable delay in filling our orders.

Personally, I would much prefer the method of taking bids on each contract of any importance in open market, this process having resulted satisfactorily to us in times past.

Yours truly,

(Signed) JOHN D. ISAACS.

(On the back of letter)

(Time stamp)
Received
Aug 2 1900
Auditing-Billing.

Government Exhibit (Gary) No. 432-a,

(June 12, 1913)

(Comprising the following extracts from the Iron & Steel Works Directory for 1901.)

(From pages 106 to 109.)

JONES & LAUGHLINS, LIMITED.

Jones & Laughlins, Limited; general offices, Third avenue and Ross street, Pittsburgh, Pa.; branch house, Lake and Canal sts., Chicago, Illinois. Officers: B. F. Jones., Jr., Chairman; Willis L. King, Vice-Chairman; Irwin B. Laughlin, Treasurer; William C. Moreland, Secretary; William Larimer Jones, General Manager; and Thomas K. Laughlin, Assistant Treasurer, all at Pittsburgh. Sales Agents: George C. Beals, Erie County Savings Bank, Buffalo, N. Y.; G. P. Bullard & Co., 8 Oliver st., Boston, Mass.; George Kinsey, Union Trust Building, Cincinnati, Ohio; H. F. Holloway, St. Paul Building, New York City; Otis, Bonnell & Co., Cuyahoga Building, Cleveland, Ohio; Waycott-Andrews Supply Company, Washington ave. and Second st., St. Louis, Mo.; John B. Newkirk & Co., Harrison Building, Philadelphia, Pa.; and F. A. Goodrich & Co., Chamber of Commerce Building, Detroit, Mich. Board of Managers: B. F. Jones., Jr., Willis L. King, Irwin B. Laughlin, William C. Moreland, William Larimer Jones, James B. Laughlin, Roland Gerry and Thomas O'C. Jones. Advisory Board: B. F. Jones, Henry A. Laughlin, George M. Laughlin, James Laughlin, Jr., and B. F. Jones, Jr. Capital stock, $20,000,000. The company operates the folowing works:

BLAST FURNACES—5.

Eliza Furnaces, Pittsburgh, Allegheny county, Pa. Four stacks, all 100 x 22: No. 1 (formerly called No. 4), built in 1888-9 and blown in in May, 1889; enlarged in 1893, partly dismantled in 1900, and enlarged and remodeled in 1901. No. 2, built in 1898-9 and blown in in September, 1899. No. 3, built in 1900 and blown in in January, 1901. No. 4, built in 1899-1900 and blown in in May, 1900. Twelve Siemens-Cowper stoves; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; total annual capacity, 790,000 gross tons. Brand, "Eliza." Equipped with three pig-iron casting machines. Eugene L. Messler, Furnace Superintendent. Old No. 2 stack, 75 x 15, built in 1861, dismantled in 1898, and old No. 3 stack, 80 x 20, built in 1886-7, dismantled in 1900. Formerly operated by Laughlin & Co., Limited). Active in 1901.

Soho Furnace, Pittsburgh, Allegheny county, Pa. One stack, 80 x 19, built in 1872 and first put in blast November 22, 1872; remodeled in 1888; four improved Cowper stoves; fuel, coke; ore, Lake Superior; product, basic open-hearth and Bessemer pig iron; annual capacity, 100,000 gross tons. Brand, "Soho." A. M. Young, Furnace Superintendent. (Formerly operated by Laughlin & Co., Limited.)—Active in 1901.

Total annual capacity of the 5 stacks, 890,000 gross tons.

ROLLING MILLS AND STEEL WORKS—2.

American Iron and Steel Works, Pittsburgh, Allegheny county, Pa. Works in the Twenty-fourth and Twenty-fifth wards, South Side. Built in 1852; 26 heating furnaces, 21 trains of rolls, and 3 hammers. Bessemer steel works built in 1886; two 10-gross-ton converters; first blow made August 19, 1886; annual capacity, 600,000 gross tons of ingots. Open-hearth steel department added in 1895 and enlarged in 1896; one 25-gross-ton acid and six 40-gross-ton basic furnaces; first steel made September 28, 1895; annual capacity, 150,000 tons of ingots. Product, steel bars, rails, plates, sheets, structural shapes, steel billets, wire rods, railroad splice bars and bolts, boat and railroad spikes, machine and bridge bolts, chains, railroad coupling links and pins, forgings, steel castings, cold-rolled shafting, finger bars, couplings, hangers, pillow blocks, and pulleys; annual capacity, 700,000 gross tons of steel billets and blooms and 625,000 tons of finished material. Adding one 40-inch blooming mill. Connected with the works are three foundries (two iron and one steel), a chain factory, a bolt factory, and machine shops. Fuel, coal, natural gas and producer gas. Brand, "American." (Works operated for many years by Jones & Laughlins, Limited.)

Soho Department, Second avenue, near Brady street, Pittsburgh, Allegheny county, Pa. Built in 1859; 1 single and 2 double heating furnaces, 3 annealing furnaces, 2 Siemens regenerative furnaces, 10 Siemens regenerative pit furnaces, 3 trains of rolls (including a train capable of rolling plates 12 inches thick, 7 feet wide and 15 tons in weight), and one hammer. Steel department contains two 15-gross-ton acid open-hearth steel furnaces; first steel made November 29, 1883; annual capacity, 25,000 gross tons of ingots. Product, steel plates; annual capacity, 100,000 gross tons. Fuel, coal and natural gas. (Formerly called the Soho Iron and Steel Works, and operated by Laughlin & Co., Limited.)

Total annual capacity of the 2 rolling mills and steel works: Bessemer steel ingots, 600,000 gross tons; open-hearth ingots, 175,000 tons; steel billets and blooms, 700,000 tons; finished rolled material, including wire rods, 725,000 tons.

SPIKE, RIVET AND BOLT FACTORY.

Product: steel structural and tank rivets, made from either

Bessemer or basic open-hearth steel, with button head, counter-sunk, cone, or steeple head, various lengths, and from ½ of an inch to 1 inch in diameter; also special low-phosphorus basic open-hearth steel boiler rivets; also all sizes of standard railroad and pit railroad spikes, and all sizes of boat, barge and dock spikes; also round and square drift bolts; annual capacity, 8,000 gross tons.

Wire-Rod Mill.

A rod mill was completed and put in operation in May, 1901; product, wire rods; estimated annual capacity, 100,000 gross tons.

Structural Material Fitting Shops.

These shops are provided with special machines for fabricating all kinds of structural material, especially for "steel skeleton buildings." Floor framing and steel columns can be turned out rapidly. Annual capacity, 24,000 gross tons.

Chain Factory.

Product: iron and steel chains of the following grades; proof coil, B. B., B. B. B., and dredge chains; close and stud-link cable chains, railroad brake chains, switch and safety chains, agricultural chains, and conveyor, log and binding chains; annual capacity, 10,000 gross tons.

Foundries—Two Iron and One Steel.

Product: iron and steel castings; annual capacity, 17,500 gross tons of iron and 2,500 tons of steel castings. The castings in the two iron foundries are confined almost exclusively to large pulleys, sheaves, balance wheels, couplings, hangers, etc., which are finished in the machine shops.

Cold Rolling and Shafting Department.

Product: line shafting for general power transmission; also pump and piston rods, engine slides, cold-rolled angles, and special sections, together with finger bars for agricultural machine makers; annual capacity, 50,000 gross tons.

FORGE SHOP.

Product: forgings for large shafts, either straight, bossed, or with solid flanges; also housing screws, piston rods, connecting rods, etc., all made of steel; annual capacity, 3,000 gross tons.

MACHINE SHOPS.

The machine shops are equipped with tools of modern design, and can produce pulleys and balance wheels up to 30 feet in diameter and handle masses weighing 50 tons. They are designed for getting out expeditiously and in large quantities power transmission machinery of all kinds, including couplings, hangers, pillow blocks, pulleys, sheaves, balance wheels, belt tighteners, guide pulleys, binder frames, and other special devices.

IRON ORE MINES, COAL LANDS, COKE OVENS AND LIMESTONE QUARRIES.

The company owns in fee and leases a number of large iron ore properties in the Mesabi and Marquette Ranges of the Lake Superior region. In addition it has several long-time contracts for iron ore in the same ranges.

The company also owns all the capital stock of the Vesta Coal Company, which owns about 6,000 acres of land in Washington County, Pa., in the fourth pool of the Monongahela River, and about 100 acres of coal land in Fayette County, Pa.

It also owns 141 completed coke ovens in Fayette County, Pa., and 840 coke ovens at Pittsburgh. In addition it is building 246 coke ovens at Pittsburgh, Pa.

The company also owns the capital stock of the Blair Limestone Company, Limited, which operates extensive limestone quarries near Hollidaysburg, Pa.

(From pages 86 to 88).

THE LACKAWANNA IRON AND STEEL COMPANY.

The Lackawanna Iron and Steel Company; general offices, Scranton, Lackawanna County, Pa.; New York office, 100

Broadway. Officers at New York: Walter Scranton, President; Moses Taylor, Vice-President; J. P. Higginson, Secretary and Treasurer, and F. F. Graham, Assistant Treasurer. Officers at Scranton: Henry Wehrum, General Manager; Arja Williams, Assistant Secretary, and William F. Kiesel, Cashier. Board of Directors: Walter Scranton, William E. Dodge, Warren Delano, Jr., D. C. Blair, J. J. Albright, Cornelius Vanderbilt, Moses Taylor Pyne, Edmund Hayes, Moses Taylor, Arthur Scranton, Henry Wehrum, Stephen S. Palmer, Austin B. Blair, B. H. Buckingham, and Arja Williams. Authorized capital stock, $25,000,000; issued, $20,000,000, all common. The company operates the following works:

BLAST FURNACES—7.

Bird Coleman Furnaces (leased), Cornwall, Lebanon county, Pa. Two stacks: No. 1, 75 x 18, built in 1872-3 and rebuilt in 1885; No. 2, 75 x 18, built in 1879 and rebuilt in 1885; Whitwell stoves; fuel, coke; ore, Cornwall; product, principally Bessemer pig iron; total annual capacity, 80,000 gross tons. Brand, "Lackawanna." H. B. Cox, Superintendent, and Patrick Eagan, Assistant Superintendent. (Owned by the Cornwall Iron Company, Limited.)—Active in 1901.

Colebrook Furnaces (owned), Lebanon, Lebanon county, Pa. Two stacks: No. 1, 81¼ x 18, built in 1881, remodeled in 1887, and rebuilt in 1895; No. 2, 85 x 18, completed in November, 1882; Lackawanna stoves; fuel, coke; ore, Cornwall; product, principally Bessemer pig iron; total annual capacity, 125,000 gross tons. Brand, "Lackawanna." H. B. Cox, Superintendent, and Patrick Eagan, Assistant Superintendent. Active in 1901.

Franklin Furnace (owned), Franklin Furnace P. O., Sussex county, New Jersey. One stack, 67 x 16½, completed in October, 1873, and blown in January 1, 1874; abandoned in 1898 and revived in 1899; fuel, anthracite coal and coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 55,000 gross tons. S. P. Tomkins, Superintendent. (Formerly owned by the Franklin Iron Company.)—Active in 1900.

Lackawanna Furnace (owned), Scranton, Lackawanna county, Pa. One stack, No. 3, 75 x 16½, originally built in 1852;

changed to No. 4 in 1874 and to No. 3 in 1901; four Durham iron stoves; fuel, anthracite coal and coke; ores, Cornwall and Lake Superior; product, Bessemer pig iron; annual capacity, 60,800 gross tons. Brand, "Lackawanna." (Three stacks, Nos. 1, 2 and 4, dismantled.) A. H. Lee, Superintendent of Furnaces.—Active in 1901.

North Cornwall Furnace (leased), Cornwall, Lebanon county, Pa. One stack, 80 x 18, built in 1872 and rebuilt in 1890; Whitwell stoves; fuel, coke; ore, Cornwall; product, principally Bessemer pig iron; annual capacity, 45,000 gross tons. Brand, "Lackawanna." H. B. Cox, Superintendent, and Patrick Eagan, Assistant Superintendent.—Active in 1901.

Total annual capacity of the 7 furnaces, 365,800 gross tons.

ROLLING MILLS AND STEEL WORKS—2.

North Works (owned), Scranton, Lackawanna county, Pa. Commenced in 1840; 33 heating furnaces, 10 trains of rolls (one 12, two 18, two 20, three 23¼ and two 36-inch), and 2 hammers; product, light and heavy railroad steel rails, blooms, billets, angle bars and merchant bars; annual capacity, 250,000 gross tons of steel rails, blooms, billets, angle bars and merchant bars. Bessemer steel plant added in 1875; three 7-gross-ton converters and 6 pig-melting and 3 spiegel-melting cupolas; first blow made October 23, 1875; first rail rolled December 29, 1875; product, ingots for rails, billets, etc.; annual capacity, 280,000 gross tons of ingots. Fuel, anthracite culm under boilers. Brand, "Lackawanna." (Formerly operated by the Lackawanna Iron and Coal Company.)

South Works (owned), Scranton, Lackawanna county, Pa. Built in 1881-3; two 9-gross-ton Bessemer steel converters and 9 pig-melting and 3 spiegel-melting cupolas; first blow made March 29, 1883, and first steel rail rolled May 4, 1883; eight 6-ingot soaking pits, 3 trains of 32-inch rolls, and 2 blooming trains, one pass each; product, steel rails; annual capacity, 425,000 gross tons of ingots and 380,000 tons of rails. Ingots are cast in moulds on cars. Fuel, anthracite culm under boilers. Brand, "Lackawanna." (Formerly operated by the Scranton Steel Company.)

Total annual capacity of the 2 rolling mills and steel works: Bessemer steel ingots, 705,000 gross tons; steel rails, blooms, billets., etc., 630,000 tons.

NEW PLANT NEAR BUFFALO, NEW YORK.

The Lackawanna Iron and Steel Company is now engaged in erecting on the lake shore at West Seneca, Erie county, New York, a short distance below Buffalo, an extensive blast furnace, rolling mill and steel plant, which it expects to have completed in 1902. When completed this plant will produce iron and steel in all the forms now produced at Scranton and elsewhere and also additional products. The company has secured about 1,500 acres of land along the lake front at and beyond Stony Point, starting from the line of the city limits of Buffalo. The tract includes a large frontage on the new harbor formed by the very extensive breakwater now being completed by the United States Government. Through a connecting road now being built by an affiliated interest of the Lackawanna Iron and Steel Company direct connection is secured with 26 railroads entering the city of Buffalo. Supplies of raw material will be drawn from sources heretofore controlled by the company and from new sources recently acquired by it, including several thousand acres of excellent coking coal in Indiana and Cambria counties, Pennsylvania. It is the intention of the company to haul the coal from this section to Lebanon, Pennsylvania, and also to its new plant below Buffalo, where it will be coked for the use of its blast furnaces.

(From pages 69 to 77, inclusive.)

REPUBLIC IRON AND STEEL COMPANY.

Republic Iron and Steel Company; general offices, Stock Exchange Building, Chicago, Illinois. Officers: Alexis W. Thompson, President; G. Watson French, Chairman of Executive Committee; Archibald W. Houston, William E. Taylor, John F. Taylor and William Barret Ridgely, Vice-Presidents; John F. Taylor, Treasurer; Y. B. Haagsma, Secretary and General Auditor; George A. Baird, General Sales Agent; and H. R. Moore, Traffic Manager. The district offices of the company are located as follows: Southern District—Office, Birmingham, Alabama; W. H. Hassinger, District Manager, and D. M. Forker, District Treasurer. Valley District—Office, Youngstown, Ohio; Thomas Parrock, Superintendent Brown Bonnell and Mahoning Valley Works. Northern Ohio District—Office, Massillon, Ohio; J. C. Corns, District Manager. Ohio River District—Office, Cincinnati, Ohio; ...., District Manager. Valley Furnaces—Office, Youngstown, Ohio; ...., Manager. Mines —Office, Negaunee, Michigan; Alexander Maitland, General Manager. Sales Agents—C. A. Maydwell, 308 Market st., San Francisco, California; Fred J. Rowlands, Butte City, Montana; E. M. Miller, Salt Lake City, Utah; A. V. Boswell, Joplin, Mo.; B. S. Adams, Mermod-Jaccard Building, Broadway and Locust st., St. Louis, Mo.; E. W. Parker, Manhattan Life Building, 66 Broadway, New York City; L. A. Burrell, northwest corner Elm and Second sts., Cincinnati, Ohio; C. T. Johnston and B. F. Harper, Western Reserve Building, Cleveland, Ohio; George M. Kenyon, 109 Endicott Arcade, St. Paul, Minn.; W. S. Johnston, 910 Ellicott Square, Buffalo, N. Y.; and L. C. Frazer, Birmingham, Alabama. Board of Directors: August Belmont, G. Watson French, Archibald W. Houston, W. H. Hassinger, Peter L. Kimberly, Edwin N. Ohl, William Nelson Page, Harry Rubens, William Barret Ridgely, Grant B. Schley, George R. Sheldon, William E. Taylor, John F. Taylor, Alexis W. Thompson and Randolph S. Warner. Executive Committee: G. Watson French, Chairman; Alexis W. Thompson, John F. Taylor, Harry Rubens and William E. Taylor. Capital stock, $55,000,000, of which $25,000,000 is 7 per cent. preferred and $30,000,000 is common. The company operates or controls the following works:

Blast Furnaces—6 Completed and 1 Building.

Atlantic Furnace (operated by the Atlantic Iron and Steel Company), New Castle, Lawrence county, Pa. One stack, 75 x 17, originally built in 1868; rebuilt in 1886; four Whitwell stoves, each 65 x 18, added in 1889; fuel, coke; ore, Lake Superior; product, Bessemer pig iron; annual capacity, 95,000 gross tons. Brand, "Atlantic." (Formerly called Etna Furnace.) George L. Pearson, Furnace Superintendent. (One stack, 75 x 16, built in 1868, dismantled in 1899.)—Active in 1901.

Hall Furnace, Sharon, Mercer county, Pa. One stack 60 x 14, built in 1845: rebuilt in 1882 and 1891; five iron pipe stoves: fuel, Connellsville coke; ore, Lake Superior; product, Bessemer, mill, and foundry pig iron; annual capacity, 45,000 gross tons. Brand, "Hall." G. B. Le-Van, Furnace Superintendent. (Formerly called the Sharon Furnace, and operated by the Sharon Iron Company, Limited.)—Active in 1901.

Hannah Furnace, Youngstown, Mahoning county, Ohio. One stack, 75 x 16, first put in blast June 14, 1880; rebuilt in 1888 and remodeled in 1900; two Cowper-Kennedy and three Massicks & Crooke stoves; fuel, Connellsville coke; ore, Lake Superior; product, Bessemer and mill pig iron; annual capacity, 95,000 gross tons. Brand, "Hannah." Bert Deetrick, Furnace Superintendent. (Formerly operated by The Mahoning Valley Iron Company.)—Active in 1901.

Haselton Furnace, Youngstown, Mahoning county, Ohio. Furnace at Haselton, now a part of Youngstown. One stack, 76 x 16 1/3, built in 1867 and rebuilt in 1880, 1892, 1896 and 1900; four Cowper-Kennedy stoves; fuel, coke; ore, Lake Superior; product, Bessemer and foundry pig iron; annual capacity, 95,000 gross tons. Brand, "Haselton." Charles Hart, Furnace Superintendent. (Formerly called the Haselton Iron Works, and operated by The Andrews Brothers Company.)—Active in 1901.

Pioneer Furnaces (operated by the Pioneer Mining and Manufacturing Company), Thomas, Jefferson county, Alabama. Two completed stacks, each 75 x 16½, and one building stack: No. 1 built in 1886-8 and blown in May 15, 1888; No. 2 built in 1889-90 and blown in February 22, 1890; eight Siemens-Cowper-Cochrane stoves; fuel, Alabama coke; ores, red and brown hematite from company's mines near the furnaces; product, foundry pig iron; total annual capacity, 125,000 gross tons. Brand, "Pioneer." The building stack is to be 85 x 18½ feet and will be completed about December, 1901; it will have four Massicks & Crooke stoves and an annual capacity of about 90,000 gross tons. Frank Keyser, Furnace Superintendent. Selling agents, M. A. Hanna & Co., Cleveland, Ohio.—Active in 1901.

Total annual capacity of the 6 completed furnaces, 455,000 gross tons; of the building furnace, 90,000 tons.

Rolling Mills and Steel Works—27.

Alabama Works, Gate City, Jefferson county, Alabama. Built in 1887-8 and put in operation in February, 1888; 23 single puddling furnaces, 2 gas heating furnaces and 3 trains of rolls (18-inch muck and 8 and 16-inch bar); product, bars, bands, hoops, light T rails, angles from 1 to 2½ inches, and light channels; annual capacity, 24,000 gross tons. Fuel, coal in puddling furnaces and manufactured gas in heating furnaces. (Formerly operated by the Alabama Rolling Mill Company.)

Alexandria Works, Alexandria, Madison county, Indiana. Built in 1893-5, using part of machinery formerly operated by the New Albany Rail Mill, at New Albany, Indiana, and the Valley Steel Company, at Belleville, Illinois; put in operation in July, 1895; 9 single and 5 double puddling furnaces, 8 forge fires, 6 bar heating furnaces, 5 regenerative gas heating furnaces, and 5 trains of rolls (one 20-inch muck, one 21-inch bar, and one 8, one 9, and one 12-inch guide); product, muck bar, bar iron and steel, railroad splices, and small rails; annual capacity, 40,000 gross tons. Fuel, natural gas in all departments. (Formerly operated by the Union Steel Company. The two 5-gross-ton Bessemer steel converters and the 32-inch blooming mill formerly in these works have been removed to the Brown Bonnell Works, at Youngstown, Ohio.)

Andrews Works, Youngstown, Mahoning county, Ohio. Built at Niles, Trumbull county, in 1872 and removed to Haselton, a suburb of Youngstown, in 1880-1; 16 double puddling furnaces, 2 scrap furnaces, 6 heating furnaces, and 4 trains of rolls (one 8, one 10, one 16 and one 22-inch); product, bar, rod, skelp and band iron and steel; annual capacity, 45,000 gross tons. Fuel, coal and slack. Brand, "Haselton."

(Formerly called the Haselton Iron Works and operated by The Andrews Brothers Company.)

Atlantic Works (operated by the Atlantic Iron and Steel Company), New Castle, Lawrence county, Pa. Consolidation, in November, 1874, of the Etna Iron Company and the Onondaga Iron and Nail Company; 3 double puddling furnaces, 25 single puddling furnaces, 5 heating furnaces, and 4 trains of rolls (8, 16, 2-high 18, and 3-high 18-inch); product, merchant bar iron and skelp iron; annual capacity, 18,000 gross tons. Fuel, coal and slack. (Nail factory, containing 55 cut-nail machines, abandoned and dismantled in 1899.) A. W. Thompson, President; John F. Taylor, Vice-President and Treasurer; Fred A. Davis, Assistant Treasurer; Edwin N. Ohl, Secretary and General Manager.

Birmingham Rolling Mills (operated by the Birmingham Rolling Mill Company), Birmingham, Jefferson county, Alabama. Built in 1880 and first put in operation in July, 1880; enlarged in 1887 and 1895; 11 double and 24 single puddling furnaces, one scrap gas furnace, 7 gas, 4 box annealing, 2 pair, and 4 sheet heating and annealing furnaces, and 10 trains of rolls, (two 8-inch guide, one 16-inch bar, two 18-inch forge, two 24-inch sheet, one 26-inch plate, and one 24-inch finishing, all hot, and one cold sheet train.) Open-hearth steel department, containing two Siemens 30-gross-ton basic furnaces, built in 1897; first steel made July 22, 1897; annual capacity, 30,000 gross tons of ingots. Product, iron and open-hearth steel bars, plates, sheets, angles, round-edge tire, small T rails, fish-plates, etc.; annual capacity, 70,000 gross tons. Fuel, coal and producer gas. James G. Caldwell, President; D. M. Forker, Secretary and Treasurer; W. H. Hassinger, District Manager; J. D. Dwyer, Superintendent.

Brown Bonnell Works, Youngstown, Mahoning county, Ohio. Built in 1846; 41 double puddling furnaces, 7 gas and 6 coal heating furnaces, 2 annealing furnaces, 4 spike and 2 washer machines, and 10 trains of rolls (three 20-inch muck, and two 8, two 10, one 12, one 18 and one 20-inch finishing); product, bars, beams, channels, angles, universal mill plates, angle splices, railroad and boat spikes, links and pins, washers and plates; annual capacity, 135,000 gross tons. A guide and a hoop mill may be added to these works. Bessemer steel department added in 1900, utilizing the Bessemer converters and the 32-inch blooming mill formerly in the Alexandria Works, at Alexandria, Indiana, and the Bessemer converters formerly in the Springfield Works, at Springfield, Illinois, which were removed to these works, entirely rebuilt, and the equipment largely increased; plant now has two 6-gross-ton converters; first steel made in September, 1900; annual capacity, 350,000 gross tons of ingots and 325,000 tons of blooms; a continuous billet mill is being added to the 32-inch blooming mill and will be completed in 1901. A mill for the manufacture of small billets, to be completed in 1901, is also being added. Fuel, coal and producer gas. Brand, ''Brown Bonnell.'' (Formerly operated by The Brown Bonnell Iron Company.)

Central Works, Brazil, Clay county, Indiana. Built in 1882-3 and first put in operation January 12, 1883; 9 double puddling furnaces, 1 gas and 9 coal heating furnaces, 4 spike machines, 6 trains of rolls (one 8, two 10, one 16 and two 20-inch), and one 1,500-lb. and two 4-ton hammers; product, bar iron, light T rails, car axles, forgings, Acheson's patent railroad spikes and Williams's wrought-iron open hexagonal turnbuckles; annual capacity, 12,000 gross tons of rolled iron, 3,000 gross tons of forged iron, 7,000 gross tons of spikes, and 300,000 turnbuckles. Fuel, producer gas. Brand, ''Central.'' A factory for the manufacture of bolts, nuts and rivets is connected with the works. (Formerly operated by The Central Iron and Steel Company.)

Cleveland Works, Cleveland, Cuyahoga county, Ohio. Built in 1852; 4 single puddling furnaces, 8 scrap furnaces, 5 heating furnaces, 2 regenerative gas heating furnaces, 4 trains of rolls (8, 9, and 18-inch), and 4 hammers; product, locomotive and car axles, iron and steel forgings, iron shafting up to 20-inch round, and merchant bar iron; annual capacity, 30,000 gross tons of rolled and 7,000 tons of forged products. Fuel, bituminous coal and manufactured gas. (Formerly called the Lake Erie Iron Works and operated by the Lake Erie Iron Company.)

Corns Works, Massillon, Stark county, Ohio. Built in

1873 and put in operation January 4, 1875; 4 single puddling furnaces, 4 scrap furnaces, one regenerative gas heating furnace, and 2 trains of rolls (one 9 and one 18-inch); product, best common and refined bar iron; specialties, shapes to pattern and iron for agricultural implements; annual capacity, 9,000 gross tons. Fuel, bituminous coal and manufactured gas. (Formerly called the Massillon Rolling Mill and operated by The Corns Iron and Steel Company.)

Eagle Works, Ironton, Lawrence county, Ohio. Built in 1852 and enlarged several times since; 16 single puddling furnaces, 3 double puddling furnaces, 3 gas furnaces for bar and guide mills, one scrap furnace, and 3 trains of rolls (one 18-inch muck, one 3-high 16-inch bar, and one 9-inch guide); product, bars and 8 to 16-lb. rails; annual capacity, 25,000 gross tons. Fuel, natural gas. (Formerly called the Ironton Rolling Mill and operated by The Eagle Iron & Steel Company.)

Indiana Works, Muncie, Delaware county, Indiana. Built in 1892, utilizing machinery from the Lancaster Iron Company's rolling mill at Lancaster, Ohio; first put in operation in July, 1892; one double and 14 single puddling furnaces, 6 scrap furnaces, 1 regenerative scrapping furnace, 5 regenerative heating furnaces, and 4 trains of rolls (one 3-high 20-inch muck, and one 8, one 10, and one 16-inch finishing); product, iron and steel bars, bolts, nuts, bridge rods, and gimlet-pointed coach screws; annual capacity, 50,000 gross tons of finished products. Fuel, natural gas. (Formerly operated by The Indiana Iron Company.)

Inland Works, East Chicago, Lake county, Indiana. Built in 1889 and first put in operation September 15, 1889; 15 double and 4 single puddling furnaces, 7 heating furnaces, one piling furnace, and 6 trains of rolls (one 18 and one 22-inch muck, and one 8, one 9, one 10, and one 18-inch finishing); product, bar iron and steel; annual capacity, 70,000 gross tons. Fuel, coal. (Formerly operated by the Inland Iron and Forge Company.)

Mahoning Valley Works, Youngstown, Mahoning county, Ohio. Built in 1871; 25 double puddling furnaces, 4 busheling furnaces, 7 coal and 5 gas heating furnaces, 55 cut-nail machines with an annual capacity of 120,000 kegs, two 20-inch muck trains, and 7 trains of finishing rolls (one 7, one 9, one 12, one 16, two 18, and one 24-inch); product, merchant bar iron, angles, and tank and plate iron; annual capacity, 65,000 gross tons. A plant for the manufacture of "Acme" polished shafting, which was entirely rebuilt and enlarged in 1900, is connected with these works; daily capacity, 25 gross tons. Fuel, bituminous coal. Brands, "M. V. I." for shafting, "I. X. L." for horseshoe bars, "B. Q." for bridge iron, and "M. S. B." for stay-bolt iron. (Formerly operated by The Mahoning Valley Iron Company.)

Marion Works, Marion, Grant county, Indiana. Built in 1893 and put in operation in September, 1893; 2 regenerative gas heating furnaces and one 10-inch train of rolls; product, rods, squares, flats, ovals, and hoop and band iron and steel; annual capacity, 18,000 gross tons. Fuel, natural gas. (Formerly operated by The Marion Steel and Iron Company, Incorporated.)

Minnesota Iron Works (operated by the Minnesota Iron and Steel Company), Columbia Heights, Anoka county, Minnesota. Built in 1894-5; 4 gas heating furnaces and 3 trains of rolls (9 and 12-inch guide and one 18-inch bar). Steel department added in 1898 and first steel made in January, 1899; one 22-gross-ton and two 15-gross-ton basic open-hearth steel furnaces with an annual capacity of 30,000 gross tons of ingots. Product, bar iron and basic open-hearth steel bars and shapes; annual capacity, 25,000 gross tons. Fuel, producer gas. The open-hearth steel department is equipped with improved Wellman charging machines and other modern labor-saving devices. R. S. Warner, President; G. D. Wick, Vice-President; William Barret Ridgely, Secretary; and J. F. Taylor, Treasurer. (Formerly called the Minneapolis Rolling Mills.)

Mitchell-Tranter Works, Covington, Kenton county, Kentucky. Built in 1873; 10 puddling, 3 scrap, and 5 heating furnaces, two 5-ton steam hammers, and one 18-inch muck mill, one 8 and one 10-inch guide mill, one 20-inch bar mill, and one 26-inch plate mill; one 7-gross-ton Siemens acid open-hearth steel furnace, built in 1879, with an annual capacity of 4,500 gross tons of ingots; product, plate, channel, angle, and merchant iron, and boiler plate and plow steel; annual capacity, single turn, 15,500 gross tons. Fuel, coal. Brand, "Crown" horseshoe bar and refined iron. (Formerly operated by Mitchell, Tranter & Co.)

Muncie Works, Muncie, Delaware county, Indiana. Built in 1893 and first put in operation in April, 1894; 6 single puddling furnaces, 2 heating furnaces, and 3 trains of rolls (one 20-inch muck, one 12-inch breaking down, and one 10-inch finishing); product, band and bar iron; annual capacity, 20,000 gross tons. Fuel, natural gas exclusively. (Formerly operated by The Muncie Iron and Steel Company.)

New Albany Works, New Albany, Floyd county, Indiana. Forge built in 1869; rolling mill added in October, 1887; 12 coal heating furnaces, 3 forge fires, 3 trains of rolls (10, 18, and 21-inch), and 6 hammers; product, car axles, shafting, forgings, and bar and structural iron; annual capacity, 9,000 gross tons of axles, 1,500 tons of forgings, and 30,000 tons of bars. Fuel, coal. (Formerly operated by the Indiana Forge and Rolling Mill Company.)

Sharon Works, Sharon, Mercer county, Pa. Built in 1850; 8 single puddling furnaces, 13 double puddling furnaces, 12 heating furnaces, and 5 trains of rolls (one 8-inch guide, one 12, one 16, and one 18-inch bar, and one 24-inch plate); product, bar, band, hoop, tank, and light T rails; annual capacity, 30,000 gross tons. Fuel, coal and producer gas. (Formerly operated by the Sharon Iron Company, Limited.)

Springfield Works, Springfield, Sangamon county, Illinois. Open-hearth steel works built in 1879; two 20-gross-ton Siemens-Pernot acid furnaces and one Pernot furnace for dephosphorizing pig metal; first steel ingot made February 9, 1880; annual capacity, 18,000 gross tons. Bar mills contain 13 Siemens heating furnaces and one 9 and one 12-inch Belgian mill, one 12-inch mill, one 18-inch mill, and one 23-inch mill, adapted to work either iron or steel, and two 16-inch combination mills to roll steel exclusively; product, bars, fish-plates, light rails and merchant shapes; annual capacity, 70,000 gross tons. Plate mill contains one 31-inch train with rolls 112 inches in length; product, steel plates of all sizes;

annual capacity, 18,000 gross tons. Fuel, Siemens producer gas in all heating furnaces. (Two 5-gross-ton Bessemer steel converters removed to the Brown Bonnell Works, at Youngstown, Ohio, in 1900. Entire plant formerly operated by the Springfield Iron Company.)

Sylvan Works, Moline, Rock Island county, Illinois. Built in 1894 and first put in operation in December, 1894; 5 gas heating furnaces, 2 coal heating furnaces, 2 forge fires and one 8-inch, one 12-inch, one 16-inch and one 18-inch mill; (the 16-inch mill is an auxiliary to the 12-inch, and is used for roughing billets to be rolled on the 12-inch mill); product, merchant bar and refined iron, soft and hard steel, and iron and steel agricultural shapes; annual capacity, 40,000 gross tons. Brand, "S." Fuel, producer gas. (One 5-gross-ton basic open-hearth steel furnace, built in 1898, dismantled in 1900. Formerly operated by the Sylvan Steel Company.)

Terre Haute Works, Terre Haute, Vigo county, Indiana. Built in 1868; destroyed by fire September 19, 1873, and rebuilt in the winter of 1873-4; enlarged in 1883 and 1884; 5 double puddling furnaces, 16 single puddling furnaces, 2 regenerative gas heating furnaces and 3 trains of rolls (one 19-inch muck, one 18-inch bar and one 10-inch guide); product, bars, bands, horseshoe and refined iron, and light T rails; annual capacity, 28,000 gross tons. Fuel, block coal and manufactured gas. Brands, "Terre Haute" and "Vigo." Works also contain 64 cut-nail machines, which are idle. (Formerly operated by the Terre Haute Iron and Steel Company.)

Toledo Works, East Toledo, Lucas county, Ohio. Built in 1883-4, burned April 10, 1887, and rebuilt in 1887-8; one single and 3 double puddling furnaces, 5 heating furnaces, 6 scrap furnaces, 4 trains of rolls, (one 8, one 10, and two 18-inch), and one 5-ton hammer; product, extra quality assorted iron and steel merchant bar, band and shafting; annual capacity, 30,000 gross tons. Fuel, coal. (Formerly called the Maumee Rolling Mill and operated by the Toledo Rolling Mill Company.)

Tudor Works, East St. Louis, St. Clair county, Illinois. First put in operation in January, 1873; two double puddling furnaces, 9 single busheling furnaces, 11 heating furnaces, 6 trains of rolls, and 10 automatic and 8 hand spike machines; product, railroad splices, T rails, bar iron, bolts and nuts and spikes; annual capacity, 55,000 gross tons. Fuel, bituminous coal and producer gas. (Formerly operated by the Tudor Iron Works.)

Wabash Works, Terre Haute, Vigo county, Indiana. Completed in 1874; one double and 15 single puddling furnaces, one scrap and 3 heating furnaces, and 3 trains of rolls (8-inch guide, 18-inch bar, and 20-inch muck); product, bars, bands, horseshoe bar, light T rails, etc.; annual capacity, 22,500 gross tons. Fuel, block coal. Brands, "Wabash," "Maud S." and "Vigo." (Formerly operated by the Wabash Iron Company.)

Westerman Works, Marion, Grant county, Indiana. Built in 1890-1 with machinery from the abandoned Prospect Mill at Cleveland, Ohio; 4 heating furnaces and 2 trains of rolls (one 9 and one 15-inch); product, bar iron; annual capacity, 10,000 gross tons. Fuel, natural gas. Brand, "Westerman." (Formerly operated by the Westerman-Stewart Iron Company.)

Wetherald Works, Frankton, Madison county, Indiana. Built in 1893, utilizing machinery from the abandoned Wetherald Rolling Mill at Findlay, Ohio; first put in operation in January, 1894; 6 single scrap furnaces, 3 regenerative gas heating furnaces, and 3 trains of rolls (8, 10 and 18-inch); product, bar and band iron; annual capacity, 18,000 gross tons. Fuel, natural gas. (Formerly called the Wetherald Rolling Mill and operated by the Wetherald Rolling Mill Company.)

Total annual capacity of the 27 rolling mills and steel works: Bessemer steel ingots, 350,000 gross tons; open-hearth steel ingots, 82,500 tons; Bessemer steel blooms and billets, 325,000 tons; rolled and forged products, 1,043,500 tons; spikes, 15,000 tons; cut nails, 120,000 kegs; polished shafting, 7,500 tons, and turnbuckles, 300,000.

BOLT, NUT, RIVET AND SPIKE WORKS—4.

Brown Bonnell Works, Youngstown, Ohio. Product, railroad and boat spikes. (Formerly operated by The Brown Bonnell Iron Company.)

Central Works, Brazil, Indiana. Product, iron and steel bolts, nuts and rivets. Sizes: Bolts, from ½ of an inch to 2 inches; nuts, from ½ of an inch to 2 inches; rivets, from ½ of an inch to 1 inch. Also make Acheson's patent railroad spikes. (Formerly operated by the Central Iron and Steel Company.)

Indiana Works, Muncie, Indiana. Product, iron and steel bolts, nuts and rivets. Sizes: Bolts, usual sizes for carriages, machinery, plows, coaches, etc.; nuts, usual sizes and all kinds; rivets, all kinds, from ¼ of an inch to 2 inches. (Formerly operated by the Indiana Iron Company.)

Tudor Works, East St. Louis, Illinois. Product, iron and steel bolts and nuts. Sizes: Bolts, nothing smaller than ⅜ of an inch; nuts, from ¼ of an inch to 2 inches. Also make railroad spikes. (Formerly operated by the Tudor Iron Works.)

CAR-AXLE WORKS—3.

Central Works, Brazil, Clay county, Indiana. Product, iron and steel passenger, freight, locomotive and engine truck axles; annual capacity, 12,000 axles. (Formerly operated by the Central Iron and Steel Company.)

Cleveland Works, Cleveland, Ohio. Product, locomotive, truck and M. C. B. car axles; annual capacity, 30,000 axles. (Formerly operated by the Lake Erie Iron Company.)

New Albany Works, New Albany, Indiana. Product, all kinds of car axles; annual capacity, 18,000 axles. (Formerly operated by the Indiana Forge and Rolling Mill Company.) Total annual capacity of the 3 works, 60,000 axles.

IRON-ORE MINES.

The company operates the Cambria and Lillie iron-ore mines at Negaunee, Michigan, in the Marquette Range of the Lake Superior iron-ore region, and the Franklin, Victoria, Bessemer and Pettit mines, at Virginia, Minnesota, in the Mesabi Range of the same region. It also owns an interest in the Mesabi iron-ore mines of the Mahoning Ore and Steel Company, and a one-half interest in the property of the Union Ore Company in the Mesabi Range.

COKE OVENS AND COAL LANDS.

It also operates 80 coke ovens and owns about 550 acres of coking coal lands in the Connellsville region of Pennsylvania. The company also has in operation 910 coke ovens at the Pioneer Furnaces at Thomas, Alabama.

(From pages 103 to 106.)

CAMBRIA STEEL COMPANY.

Cambria Steel Company; general offices, Harrison Building, southwest corner Fifteenth and Market streets, Philadelphia. Officers at Philadelphia: Powell Stackhouse, President; John W. Townsend, First Vice-President; J. Lowber Welsh, Second Vice-President; William S. Robinson, Secretary and Treasurer, and A. P. Robinson, Assistant Secretary and Assistant Treasurer. Officers at Johnstown: Charles S. Price, General Manager, and H. S. Endsley, Solicitor and General Agent. Sales offices: New York City, H. L. Waterman, 71 Broadway; Chicago, C. J. Ellis, 209 Western Union Building; Toledo, Ohio, for rails, W. E. C. Coxe, 316 The Nasby; Cincinnati, Ohio, J. L. Adams, Union Trust Building; Cleveland, for structural and merchant steel, the Bourne-Fuller Company, Perry-Payne Building; Atlanta, Georgia, F. I. Stone & Co., Southern Agents, Austell Building; St. Louis, for rails, E. H. Linley Supply Company, 714 North Second street; for structural and merchant steel, H. P. Hubbell, Chemical Building; Pittsburgh, Pa., William McLain, 818 Park Building; Boston, Mass., for structural steel, H. W. Hayes & Co., 70 Kilby street, and Baltimore, Maryland, Jameson, McKenzie & Evans, 310 North st. Board of Directors: Effingham B. Morris, Edward T. Stotesbury, J. Lowber Welsh, Leonard C. Hanna, Frank J. Firth, Theodore N. Ely, George F. Baer, John W. Townsend and Powell Stackhouse. Capital stock, $50,000,000; par value, $50 per share; issued and full paid, 900,000 shares, aggregating $45,000,000. The company operates the following works:

BLAST FURNACES—6.

Cambria Furnaces, Johnstown, Cambria county, Pa. Six stacks: Nos. 1, 2, 3, and 4 were built in 1853 and 1854; No. 1, 76 x 20, was rebuilt in 1883, 1895, and 1899; No. 2, 98 x 21, was rebuilt in 1883, 1891, 1896, and 1901; No. 3, 95¾ x 20½, was rebuilt in 1886, 1894, and 1900; No. 4, 76 x 18, was rebuilt in 1886 and 1892; No. 5, 96 x 21, was built in 1873-6, blown in December 22, 1876, and rebuilt in 1890 and 1896-7; No. 6, 76 x 20¾, was first blown in July 20, 1879, and rebuilt in 1893, 1896, and 1900. The furnaces are equipped with twenty-three Whitwell stoves. Fuel, Connellsville and Otto-Hoffman coke; ores, Menominee and Mesabi hematite and native and foreign manganiferous; product, Bessemer and basic open-hearth pig iron and spiegeleisen and ferromanganese; total annual capacity, 650,000 gross tons. Equipped with two pig-iron casting machines. (Formerly operated by the Cambria Iron Company.)—Active in 1901.

Total annual capacity of the 6 furnaces: 650,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Cambria Rolling Mills and Steel Works, Johnstown, Cambria county, Pa. First built in 1853; Bessemer steel works made their first blow July 10, 1871; rebuilt and enlarged in 1889 and 1891; four 11½-gross-ton converters; annual capacity, 600,000 gross tons of ingots.

Open-hearth steel works, built in 1878-9, now contain two 20-gross-ton furnaces (one acid and one basic), one built in 1895 and one in 1896, and two 20-gross-ton basic Wellman furnaces built in 1897; annual capacity, 11,000 gross tons of acid ingots and 34,000 tons of basic ingots.

Blooming mill contains 7 pit-hole heating furnaces, one 2-high 48-inch blooming mill, one set; one 2-high 40-inch blooming mill, one set; and one 3-high 30-inch billet, slab, and beam mill, four sets.

Rolling mills contain 9 Siemens furnaces, 26 reverberatory furnaces, one 28-inch rail mill, three sets; one 21-inch light rail and structural mill, 3 sets; two 21-inch structural and bar mills, three sets each; one 12-inch splice bar mill, four sets;

one 22-inch 2-high puddle mill, two sets; and one 22-inch 2-high plate mill, two sets; also the following merchant steel mills: one 16-inch 2-high mill; one 10 and 12-inch train, nine sets; one 9-inch train, six sets; one 9-inch mill, nine sets; one 8-inch mill, five sets; one 10-inch train, eight sets; one 12-inch train, four sets; one 14-inch train, eight sets; one 16-inch train, three sets; one 20-inch train, three sets; and one 12-inch cold-rolling train. Also a cold-drawing plant, with full equipment of furnaces, shears, hammers, and special machinery.

Franklin open-hearth steel department, built in 1900-1901; six 50-gross-ton stationary furnaces (5 basic and one acid); first open-hearth steel made April 20, 1901; one 2-high 40-inch blooming mill, one set; annual capacity, 150,000 gross tons of basic ingots and 30,000 gross tons of acid ingots. Adding one 2-high 34-inch slabbing mill, one set.

Fuel used in all departments, coal and producer gas. (Formerly operated by the Cambria Iron Company.)

Total annual capacity of the rolling mills and steel works: Bessemer steel ingots, 600,000 gross tons; open hearth steel ingots, 225,000 tons; finished steel, 300,000 gross tons of steel rails and 325,000 tons of structural shapes and merchant steel for tire, spring, toe-calk, machinery, plow steel, finger bars, harrow discs, rake teeth, etc.

CAR-AXLE WORKS.

Cambria Steel Company, Harrison Building, Philadelphia. Works at Johnstown, Pa. Product, open-hearth steel axles, annealed and tempered by the Coffin process; annual capacity, 45,000 axles.

BOLT, NUT, AND RIVET WORKS.

Cambria Steel Company, Harrison Building, Philadelphia. Works at Johnstown, Pa. Product, all sizes of iron and steel bolts, nuts, and rivets.

COAL LANDS, IRON-ORE MINES, COKE OVENS, LIMESTONE QUARRIES, ETC., ETC.

The Cambria Steel Company operates extensive coal mines in Cambria county, near Johnstown, Pennsylvania. It also operates 160 Otto-Hoffman coke ovens at Johnstown and 920 bee-hive ovens in Fayette county, Pennsylvania.

In addition the company operates works at Johnstown, Pa., for the manufacture of pitch and tarred and asphalt roofing felts. This plant is known as the North West Department.

It also owns all the stock of the Penn Iron Mining Company, operating iron-ore mines on the Menominee Range in Michigan, and one-half the stock of the Mahoning Ore and Steel Company, which operates the Mahoning Mine, on the Mesabi Range, in Minnesota.

The company also owns all the stock of the Manufacturers' Water Company, at Johnstown, Pa.

It also owns controlling interests in the Juniata Limestone Company, Limited, and the Naginey Quarry Company, Limited, both operating extensive limestone quarries in Pennsylvania.

(From pages 100 to 102.)

THE PENNSYLVANIA STEEL COMPANY.

Practically all the stock of the Pennsylvania Steel Company is owned by the Pennsylvania Steel Company of New Jersey.

The Pennsylvania Steel Company; general offices, 312-19 Girard Building, Broad and Chestnut streets, Philadelphia; branch offices, Empire Building, 71 Broadway, New York City; 70 Kilby street, Boston; Equitable Building, Baltimore; 413 Western Union Building, Chicago, and 110 Cannon street, London, E. C., England. Officers at Philadelphia: Edgar C. Felton, President; Frank Tenney, Assistant to President and Secretary; Edmund N. Smith, Treasurer, and H. F. Martin, General Sales Agent. Officers at Steelton: H. H. Campbell, Superintendent and General Manager, and John W. Dougherty, Assistant Superintendent. Sales Agents: Richard Peters, Jr., Philadelphia; S. W. Baldwin, New York City; Charles S. Clark, Boston; R. C. Hoffman & Co., Baltimore; the Q. & C. Company, Western Union Building, Chicago; J. G.

Miller, Security Building, St. Louis; G. W. Gibbs Company, 33-39 Fremont street, San Francisco, and Sanders & Co., 110 Cannon street, London, E. C., England. Capital stock, $6,500,000, of which $1,500,000 is 7 per cent. non-cumulative preferred and $5,000,000 is common. The company operates the following works:

Blast Furnaces—7.

Lebanon Furnaces, Lebanon, Lebanon county, Pa. Two stacks: No. 1, 80 x 18, built in 1845 and rebuilt in 1868 and in 1885; No. 3, 100 x 20, built in 1872-3 and put in blast in August, 1873; rebuilt in 1900; four Massicks & Crooke and four patent 3-pass Cowper stoves; fuel, anthracite coal and coke; ore, Cornwall; product, Bessemer pig iron; total annual capacity, 130,000 gross tons. Equipped with one pig iron casting machine. (No. 2 stack, built in 1847, dismantled. Formerly operated by B. D. and E. R. Coleman, Managers.)—Active in 1901.

Lochiel Furnace, Harrisburg, Dauphin county, Pa. One stack, 65 x 14, built in 1872, first put in blast in April, 1873, and remodeled in 1886; two Whitwell stoves; fuel, anthracite coal and coke; ores, foreign and domestic hematite and magnetite; product, Bessemer and low-phosphorus pig iron and spiegeleisen; annual capacity, 40,000 gross tons. Otto C. Burkhart, Superintendent of Furnace. (Formerly owned by the Lochiel Furnace Company.)—Active in 1901.

Steelton Furnaces, Steelton, Dauphin county, Pa. Four stacks: No. 1, 60 x 14, built in 1872-3, put in blast in October, 1873, and remodeled in 1883; two Whitwell stoves. No. 2, 80 x 20, built in 1874-6, put in blast in June, 1876, and remodeled in 1877; four Whitwell stoves. Nos. 3 and 4, each 70 x 18; No. 3 first put in blast in February, 1884, and No. 4 first put in blast in April, 1884; each has four Whitwell stoves; fuel, anthracite coal and coke mixed; ores, foreign and domestic hematite and magnetite; product, Bessemer, low-phosphorus and basic pig iron and spiegeleisen; total annual capacity, 260,000 gross tons. Equipped with one pig-iron casting machine. Otto C. Burkhart, Superintendent of Furnaces. Active in 1901.

Total annual capacity of the 7 furnaces, 430,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Pennsylvania Steel Works, Steelton, Dauphin county, Pa. Bessemer steel works built in 1865-7; three 10-gross-ton converters; first blow made in June, 1867; annual capacity, 300,000 gross tons of ingots; product, blooms and slabs for structural purposes, plates, nail slabs, rails of all sections, street rails, crossings, frogs, switches, steel castings and merchant steels generally.

Rail mill built in 1867-8; blooming mill added to rail mill in 1875-6 and put in operation in December, 1876; annual capacity, 180,000 gross tons of rails. No. 2 blooming mill, reversing, built in 1885-6 and put in operation in 1886. Hammer mill contains 3 hammers (one 1, one 4 and one 12-ton).

Open-hearth steel plant, containing two 15-gross-ton furnaces, erected in 1875; furnaces removed in 1883 and two 30-ton furnaces erected; one 5-ton furnace added in 1889, two 15-ton furnaces added in 1890, one 7-ton furnace added in 1892, six 50-ton furnaces added in 1893 and two 40-ton furnaces added in 1900; both acid and basic open-hearth steel are produced; plant now contains four 20 and six 50-gross-ton basic furnaces and two 6 and two 40-gross-ton acid furnaces; total annual capacity, 200,000 gross tons of ingots, worked into boiler, structural and special steels.

Merchant mill, erected in 1883, contains one 13 and one 20-inch train of rolls; billet mill, erected in 1887, contains one 20-inch train; slabbing mill, erected in 1893, contains one set of housings and includes two horizontal rolls 26 inches in diameter and two vertical rolls 20 inches in diameter. There are also machine shops and the necessary repair shops connected with the works. Fuel used in all departments, producer gas and coal.

A steel foundry, to contain 2 acid open-hearth steel furnaces (one 10 and one 20-gross-ton), with an estimated annual capacity of 18,000 gross tons, is being added to the works.

Total annual capacity of the rolling mills and steel works:

Bessemer steel ingots, 300,000 gross tons; open-hearth steel ingots, 200,000 tons; steel castings, 18,000 tons; steel rails, 180,000 tons; steel billets and slabs, 200,000 tons; other finished rolled products, 100,000 tons.

BRIDGEBUILDING WORKS.

Bridge and Construction Department, Steelton, Pa. Product, railroad and highway bridges; also erects iron and steel buildings; annual capacity, from 25,000 to 30,000 tons.

BOLT AND RIVET WORKS.

Bolt and Rivet Department, Steelton, Pa. Product, bolts and rivets for the use of the company only.

IRON-ORE MINES AND RAILROADS.

The company has also purchased the holdings in the Cornwall iron-ore banks and associated interests of the heirs of G. Dawson Coleman, of Mrs. Annie C. Rogers, and of some members of the Grubb family. The company has also acquired the interests in the Cornwall and Lebanon Railroad represented by these parties. This road is 21.66 miles long.

LIMESTONE QUARRY.

The Pennsylvania Steel Company owns and operates an extensive limestone quarry near Steelton, Pennsylvania.

(From pages 102 and 103.)

MARYLAND STEEL COMPANY.

All the stock of the Maryland Steel Company is owned by the Pennsylvania Steel Company of New Jersey.

Maryland Steel Company; general offices, Sparrows Point, Maryland, and Girard Building, Philadelphia. Officer at

Sparrows Point: F. W. Wood, President. Officers at Philadelphia: E. N. Smith, Secretary and Treasurer, and H. F. Martin, General Sales Agent. Sales Offices: Girard Building, Philadelphia; Empire Building, New York City; and 70 Kilby Street, Boston. The Company operates the following works:

BLAST FURNACES—4.

Maryland Steel Company, Sparrows Point, Baltimore county, Maryland. Four stacks; Furnaces A, B, C and D, each 85 x 20; commenced building in August, 1887, and completed in 1889, 1890, and 1891. First blasts: A, October 23, 1889; B, March 11, 1890; C, October 3, 1891; and D, April 15, 1893. Each stack is equipped with four Whitwell stoves; fuel, coke from West Virginia, the mountain district of Pennsylvania, and Connellsville, Pa.; ores, hematite from Cuba, Spain, Africa, and Newfoundland; product, Bessemer pig iron and spiegeleisen; total annual capacity, 358,000 gross tons. Furnaces are equipped with one double Heyl & Patterson pig-iron casting machine. F. P. Bassett, Furnace Superintendent. Active in 1901.

Total annual capacity of the 4 furnaces: 358,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Maryland Steel Company, Sparrows Point, Baltimore county, Maryland. Built in 1889-92; two 20-gross-ton Bessemer steel converters, 10 pit heating furnaces having a capacity of 12 ingots each, one 34-inch blooming mill, and one 27-inch rail train; first blow made August 1, 1891, and first steel rail rolled August 3, 1891; molten metal direct from the blast furnaces used in the converters; product, billets and standard sections of rails; annual capacity, 400,000 gross tons of ingots and 300,000 tons of billets and rails. Fuel, bituminous coal and petroleum. Brand, "Maryland."

Total annual capacity of the rolling mills and steel works: Bessemer steel ingots, 400,000 gross tons; rolled products, 300,000 tons.

SHIPBUILDING WORKS.

Maryland Steel Company (Marine Department), Sparrows Point, Maryland. Product, all kinds of steam and sailing vessels and barges; plant is equipped for the construction of vessels of the largest size, both hulls and machinery, and with launching ways, machine shops, foundry, etc., sufficient to provide for, equip, and finish at one time seven large ocean freight steamers.

COKE OVENS.

The Maryland Steel Company will build at Sparrows Point 200 coke ovens of the Otto-Hoffman type, with a daily capacity of 1,000 tons.

(From pages 81 to 83.)

BETHLEHEM STEEL COMPANY.

Bethlehem Steel Company; general offices, South Bethlehem, Northampton county, Pa. Officers: Edward M. McIlvain, President; A. E. Borie, Vice-President; H. S. Snyder, Secretary; A. N. Cleaver, Treasurer; Archibald Johnston, General Superintendent; and William M. Tobias, Purchasing Agent. Selling Agents: H. F. J. Porter, 100 Broadway, New York City; W. H. Mitchell, 421 Chestnut street, Philadelphia; E. Nelson, 1433 Marquette Building, Chicago; Walter Miller, Perry-Payne Building, Cleveland; S. E. Freeman, 930 North Main street, St. Louis; J. P. Larkin, 430 Endicott Building, St. Paul, Minnesota; and the Abner Doble Company, San Francisco, California. Board of Directors: Robert P. Linderman, E. T. Stotesbury, Edward M. McIlvain, Archibald Johnston, George F. Baer, J. P. Ord, and Charles MacVeagh. Capital stock, $15,000,000, all of which is common. The company operates the following works:

BLAST FURNACES—4.

Bethlehem Furnaces, South Bethlehem, Northampton county, Pa. Four stacks: No. 2, 70 x 16, built and blown in in

1867 and rebuilt in 1877; No. 4, 70 x 15, built in 1874-5 and blown in in 1876; No. 5, 70 x 16, built in 1874-5 and blown in in 1877; No. 6, 70 x 16, built in 1881 and blown in in 1883; twelve Siemens-Cowper-Cochrane stoves. Fuel, anthracite coal and Connellsville coke; product, Bessemer, basic, low-phosphorus, and foundry pig iron made from local and foreign hematite and magnetite ores; total annual capacity, 200,000 gross tons. Furnaces are equipped with one Davies pig-iron casting machine. Foundations for Furnace No. 8 laid in 1892; work suspended. (No. 1 Furnace, 61 x 15 1-3, built and blown in in 1863, abandoned in 1895, and No. 7 Furnace, (Bingen), 65 x 16, built in 1870, abandoned in 1897. Formerly operated by the Bethlehem Iron Company.)—Active in 1901.

Total annual capacity of the 4 furnaces: 200,000 gross tons.

ROLLING MILLS AND STEEL WORKS—1.

Bethlehem Rolling Mills and Steel Works, South Bethlehem, Northampton county, Pa. Established in 1860. Iron mills started in 1863; Bessemer steel works started in 1873; 7 double puddling furnaces, 17 heating furnaces, (4 ordinary reverberatory and 13 bituminous coal and fuel oil), 6 trains of rolls, (12, 22, 25, 28, 32 and 48-inch), and 4 hammers, ranging from 1,500 pounds to 10 tons each. Four 7½ gross-ton Bessemer steel converters; first blow made October 4, 1873; first steel rail rolled October 18, 1873; 8 iron cupolas and 4 spiegel cupolas. Product, iron and steel rails, billets, beams, tees, angles, puddled bars, merchant iron and steel, ingots, axle, spring, screw and wire steel, etc., and castings; annual capacity, 205,000 gross tons of rails, 55,000 tons of merchant forms, and 250,000 tons of ingots. This department also contains a general machine shop and an iron foundry. Fuel, bituminous coal, oil and manufactured gas. (Formerly operated by the Bethlehem Iron Company.)

Open-Hearth Steel Department. Eight open-hearth steel furnaces (two 40-gross-ton basic and one 10, one 20 and four 40-gross-ton acid) and one preheater; first steel melted August 11, 1888; an ingot weighing 104 gross tons has been cast; annual capacity of ingots, about 85,000 gross tons. Fuel, manufactured gas. (Formerly operated by the Bethlehem Iron Company.)

Forge and Armor Plate Department. Connected with the open-hearth steel furnaces is a plant for the fluid compression of steel, (press taking an 18-foot ingot), a forging plant containing 3 hydraulic forging presses, (one 2,000, one 5,000 and one 14,000-tons' pressure), 1 hammer with a falling weight of 125 gross tons, 8 hammers for making small forgings, and one 7,000-ton bending press; also 3 oil-tempering and annealing plants, (two for gun and other forgings and one for armor plate), and one plant for treating armor by the cementation process. These plants contain 51 heating furnaces, which are supplied with gas by 85 gas producers, and an illuminating gas plant. A crucible steel plant, containing 2 hammers and 2 furnaces, is also connected with this department. Also a blacksmith shop containing 7 hammers, ranging from 1,100 pounds to 3 tons, and one 6-ton hammer with 2 heating furnaces; also 2 machine shops, (one for general work, rough-machining and finishing forgings, and for heavy ordnance, and one for trimming and machining armor plates), and a steel foundry. Product, steel forgings and castings of all descriptions and of the largest dimensions and weight, marine and stationary engine cranks, (forged solid or built-up), shafting, (forged solid or hollow), gun carriages, heavy ordnance of all calibres, and forged armor plates, including coning towers, shields, etc.; also all grades of steel billets. The department is fully equipped with all necessary appliances and machinery for filling the requirements of the Government and ship and engine builders of the country for heavy steel shafting and miscellaneous forgings of the best quality. Fuel, manufactured gas. (Formerly operated by the Bethlehem Iron Company.)

Total annual capacity of the rolling mills and steel works: Bessemer steel ingots, 250,000 gross tons; open-hearth steel ingots, 85,000 tons; rolled products, 260,000 tons; finished armor plate, 5,000 tons; heavy steel shafting, steel forgings and iron and steel castings are also produced in large quantities.

IRON-ORE MINES AND LIMESTONE QUARRY.

The Bethlehem Steel Company controls a one-half interest in the Juragua Iron Company, Limited, which operates extensive iron-ore mines near Santiago, in the Island of Cuba. It also operates the Troxell limestone quarry, on the Catasauqua and Fogelsville Railroad, near Catasauqua, Pennsylvania.

PROVING GROUND.

At Redington, Pa., on the Lehigh Valley Railroad, is a proving ground for armor plates and ordnance, a complete establishment for these purposes having been established there by the Bethlehem Iron Company several years ago.

(From page 278.)

Inland Steel Company, 1225-29 Marquette Building, Chicago. Building works at Indiana Harbor, Lake county, Indiana, to contain four 50-gross-ton basic open-hearth steel furnaces, 10 heating furnaces, one 32-inch blooming mill, one 24-inch billet mill, and 12 finishing mills; product, ingots, billets, slabs, sheets, light plates, angles, shafting, and merchant bars; annual capacity, 125,000 gross tons of ingots and 75,000 tons of bars. Fuel, coal and manufactured gas. G. H. Jones, President; L. E. Block, Vice-President; P. D. Block, Vice-President and Treasurer; J. M. Butler, Secretary; R. J. Beatty, General Manager.—See Rolling Mills and Steel Works in Illinois.

(From page 284:)

Inland Steel Company (successor to Chicago Steel Works), 1225-29 Marquette Building, Chicago. Works at Chicago Heights, Cook county. Built at Chicago in 1873 and removed to Chicago Heights in 1893 by the Chicago Steel Works; first put in operation at Chicago Heights in January, 1894; 6 heating furnaces, one 8 and one 14-inch train of rolls, and 6 hammers; product, bars, angles, tees, channels, agricultural shapes, harrow teeth, plow beams, cultivator attachments, and fence posts; annual capacity, 30,000 gross tons of bar steel, 100,000 steel plow beams, and 1,500 tons of harrow teeth. Fuel, coal and coke in heating furnaces and bituminous coal under boilers. Brand, the word "Inland" in a diamond. —See Rolling Mills and Steel Works in Indiana.

(From pages 241 and 242.)

Ashland Steel Company, Incorporated, Ashland, Boyd county. Built in 1891; two $5\frac{1}{2}$-gross-ton Bessemer steel converters, two 4-hole gas fired soaking pit furnaces, and one 32-inch blooming mill; first blow made December 26, 1891; 1 modern Garrett wire-rod train added in 1900; product, billets, slabs, sheet and tinplate bars, and wire rods; annual capacity, 150,000 gross tons of ingots and 110,000 tons of wire rods. Fuel, natural gas. I. A. Kelly, President; Thomas M. Adams, Vice-President; B. H. Burr, Secretary; L. R. Putnam, Treasurer.

(From pages 122 to 125.)

THE COLORADO FUEL AND IRON COMPANY.

The Colorado Fuel and Iron Company; general offices. Boston Building, Denver, Colorado; branch office, Empire Building, New York City. Sales offices: Denver, Col.; El Paso, Texas; Los Angeles and San Francisco, Cal., and Salt Lake City, Utah. Officers at Denver: John C. Osgood, Chairman of the Board of Directors; J. A. Kebler, President; A. C. Cass, First Vice-President; Dennis Sullivan, Second Vice-President; John L. Jerome, Treasurer; A. D. Moss, Assistant Treasurer; D. C. Beaman, General Counsel and Secretary; Cass E. Herrington, General Attorney, Land Department; Fred Herrington, General Attorney, Operating Department; S. I. Heyn, Assistant Secretary; J. F. Welborn, General Sales Agent; John T. Kebler, General Manager of Fuel Department; C. S. Robinson, General Manager of Iron Department; J. A. Writer, Auditor, and S. G. Pierson, Purchasing Agent. Officers at New York: J. E. Heimerdinger, Third

Vice-President, and C. E. Phelps, Assistant Secretary and Assistant Treasurer. Board of Directors: John C. Osgood, of Redstone, Colorado; Dennis Sullivan, James B. Grant, W. H. James, J. A. Kebler, A. C. Cass, John L. Jerome and D. C. Beaman, all of Denver, Colorado; James A. Blair and J. E. Heimerdinger, of New York City, and John J. Mitchell, John W. Gates and John Lambert, of Chicago, Illinois. Capital stock authorized, $40,000,000. A meeting of the stockholders of the company on July 13, 1901, authorized an issue of $15,000,000 of convertible 5 per cent. debenture bonds, of which $10,000,000 will be immediately issued. The company operates or controls the following works:

BLAST FURNACES—3 COMPLETED, 2 BUILDING AND 2 PROJECTED.

Minnequa Furnaces, Pueblo, Pueblo County, Colorado. Three completed stacks and two building: Furnace C, 75 x 17, built in 1880-1, blown in September 7, 1881, and rebuilt and modernized in 1893; Furnace B, 75 x 17½, built in 1890-1 and remodeled, capacity increased and new stove added in 1901; and Furnace A, 95 x 21, built in 1900-1 and blown in September 4, 1901; thirteen Siemens-Cowper-Cochrane stoves; fuel, coke, produced at the company's ovens at Sopris and El Moro; ores, limonite, hematite and magnetite from the company's mines in Colorado, Wyoming and New Mexico; product, Bessemer, foundry, Scotch and mill pig iron and spiegeleisen; total annual capacity, 306,000 gross tons. Building two furnaces, D and E, to be 95 x 21, and to be ready for blast in 1902; total annual capacity, 292,000 tons. (One furnace, 75 x 17, built in 1887, dismantled in 1899.) Two additional furnaces, 95 x 21, may be added. Active in 1901.

Total annual capacity of the 3 completed furnaces, 306,000 gross tons; of the 2 building furnaces, 292,000 tons.

ROLLING MILLS AND STEEL WORKS—2.

Minnequa Rolling Mills and Steel Works, Pueblo, Pueblo County, Colorado. Built in 1881-2 and extensive improvements made in the years 1889, 1891 and 1893; Bessemer converting department made its first blow April 11, 1882; two

5-gross-ton converters with an annual capacity of 250,000 gross tons of ingots; 3 pig iron and 2 spiegel melting cupolas, 4 gas-fired soaking pits, 2 Siemens bloom-heating furnaces, 6 scrap heating furnaces, one 2-high 36-inch reversing blooming train, one 3-high 28-inch roughing train, one 3-high 26-inch finishing train, one 30 x 78-inch plate train, one 12 and one 20-inch bar train, one 9-inch guide train, and railroad spike and bolt and nut machines; product, standard steel rails, bar iron and steel, mine rails, angle bars, tank plate, structural shapes, railroad spikes, and nuts and bolts; annual capacity, 200,000 gross tons of steel rails, 30,000 tons of tank plate, 50,000 tons of structural shapes, 50,000 tons of bar iron and steel, mine rails and angle bars, and 120,000 kegs of railroad spikes, bolts, nuts and rivets. Also operate a cast-iron pipe foundry with an annual capacity of 18,000 gross tons. Fuel, coal and producer gas. Rail mill remodeled and plate and structural mill added in 1897. New Bessemer steel converting department now being built, to be completed in the spring of 1902 and to embrace two 15-gross-ton converters with an annual capacity of 600,000 gross tons of ingots. Also making additions to rail mill, which, when completed, will increase the rail capacity to 500,000 tons. Also building works for the manufacture of open-hearth steel, black plates, tinplates, hoops, cotton ties, wire rods, wire, wire nails, galvanized wire, etc. J. B. McKennan, General Superintendent, and R. H. Lee, Assistant General Superintendent.

Laramie Rolling Mills (operated by The Laramie Iron and Steel Company), Laramie, Albany County, Wyoming. Built in 1874-5 and put in operation in April, 1875; 5 heating furnaces, 1 puddling furnace, 1 squeezer, 2 trains of rolls (one 10 and one 19-inch), and 4 spike machines; product, bar and rod iron, mine rails, nuts, car, bridge, and machine bolts, spikes and track fastenings, and coupling pins and railway forgings; annual capacity, 30,000 gross tons of rolled products, 1,000 tons of forged products, and 90,000 kegs of bolts, nuts and spikes (200 pounds to the keg). Fuel, coal. C. S. Robinson, President; D. C. Beaman, Vice-President, and J. L. Jerome, Secretary and Treasurer, Denver, Colorado; and

A. E. Jupp, Superintendent, Laramie. The heating furnaces are being rebuilt and modernized. (The stock of the Laramie Iron and Steel Company is owned by the Colorado Fuel and Iron Company.)

Total annual capacity of the 2 rolling mills and steel works: Bessemer steel ingots, 250,000 gross tons; steel rails, 200,000 tons; tank plate, 30,000 tons; structural shapes, 50,000 tons; other rolled and forged products, 81,000 tons; and railroad spikes, bolts and nuts, 210,000 kegs.

Bolt, Nut, Rivet, and Spike Works—2.

Minnequa Works, Pueblo, Pueblo county, Colorado. Product, iron and steel bolts, nuts, and rivets. Sizes and kinds: machine bolts, from 1/4 of an inch to 1 inch, and all sizes for bridge work and pipe bands; nuts, square and hexagon, from 1/2 of an inch to 1 1/2 inches, all standards; rivets, from 1/2 of an inch to 1 1/4 inches, with button, cone, or countersunk heads. Also produce railroad spikes. Annual capacity, included in the general description of these works, 120,000 kegs of bolts, spikes, nuts, etc.

Laramie Works (operated by The Laramie Iron and Steel Company), Laramie, Wyoming. Product, iron bolts and nuts. Sizes: bolts, from 1/2 of an inch to 1 inch in diameter; nuts, square and hexagon, to fit bolts from 1/2 of an inch to 1 inch in diameter. Also produce railroad spikes. Annual capacity included in the general description of these works, 90,000 kegs of bolts, nuts and spikes.

Total annual capacity of the 2 works: 210,000 kegs of bolts, nuts, rivets, and spikes.

Iron, Brass, and Steel Castings.

Minnequa Works, Pueblo, Colorado. Product, iron and brass castings; annual capacity, 15,000 gross tons of iron and 100 tons of brass castings. Also produce Bessemer steel castings.

Cast-iron Pipe Works.

Minnequa Works, Pueblo, Colorado. Product, cast-iron gas and water pipe; sizes, from 3 to 20 inches; daily melting capacity, 60 gross tons.

Railroads and Iron-ore Mines.

The Colorado Fuel and Iron Company owns the Crystal River Railroad, which operates 21 miles of standard and 12 miles of narrow-gauge track in Garfield and Pitkin counties, Colorado, connecting with the Denver and Rio Grande Railroad at Carbondale, Colorado; it also owns the Colorado and Wyoming Railway, which operates 16 miles of standard-gauge track in Laramie county, Wyoming, connecting with the Colorado and Southern Railway at Hartville Junction, Wyoming. It is also building 21 miles of railroad to the new coal fields in Las Animas county, Colorado. This road will connect with the Atchison, Topeka and Santa Fe Railway at Jansen, Colorado, and with the Denver and Rio Grande Railroad and the Colorado and Southern Railway at Sopris, Colorado.

The company also owns and operates iron-ore mines at Orient, Colorado; Sunrise, Wyoming, and Fierro, New Mexico; also other iron-ore properties in Colorado, New Mexico, Utah, and California.

Coal Lands, Coke Ovens, and Limestone Quarries.

It also owns approximately 300,000 acres of coal lands at Sopris, Engle, Berwind, Rouse, Walsen, Robinson, Pictou, Starkville, Coal Creek, Fremont, Rockvale, Rookside, Crested Butte, Anthracite, Floresta, Gulch, Sunlight, Placita, Coalbasin, Tabasco, Primero, and other points in Colorado, and at Los Cerrillos, Gallup, Catalpa, and Weaver in New Mexico.

In addition it owns and operates 1,214 coke ovens at Sopris, Starkville, El Moro, Crested Butte, Cardiff, and Redstone, all in Colorado, and at Waldo in New Mexico. Nine hundred new coke ovens are now being built.

The company also operates large limestone quarries at Lime, Colorado.

Government Exhibit (Filbert) No. 433,

June 17, 1913.

EXPORT SHIPMENTS BY SUBSIDIARY COMPANIES
# of the
UNITED STATES STEEL CORPORATION

During the Calendar Years 1901 and 1902.

Shipped by	1901 *Gross Tons*		1902 *Gross Tons*	
Illinois Steel Company	43,024		6,486	
Lorain Steel Company	55,150		21,111	
American Steel & Wire Company	139,519		164,714	
National and Shelby Tube Companies	37,750		40,918	
American Bridge Company	9,931		8,980	
National Steel Company (for first 6 months only in 1901)	5,794			
Total of above	291,168			
Carnegie Steel Company	169,148	(a)	21,533	For year 1902
National Steel Company (second six months 1901 only)			4	" " "
American Steel Hoop Company (second six months 1901 only)			3,458	" " "
American Steel Hoop Company (first six months 1901 only)	no data	(b)		
American Tin Plate Company	no data	(c)	1,190	
American Sheet Steel Company	no data	(c)	7,439	
Total	460,316		275,833	

(*a*) These figures cover Carnegie Steel Company for the entire year 1901 and National Steel Company and American Steel Hoop Company for second six months of 1901. These figures are not obtained from the Accounting Department records and statistics but from an old statement found in the files of the Traffic Department which in turn was compiled from a record then kept in that Department of export shipments made, but since mislaid, lost or destroyed.

(*b*) No data now available showing shipments during this period by American Steel Hoop Company but it is known amount was very small.

(*c*) The shipments of these two companies for export, if anything, were substantially negligible. No records are now available showing what tonnage, if any, they shipped.

Government Exhibit (Filbert) No. 435,

June 25, 1913.

CLASSIFIED SHIPMENTS OF IRON, STEEL AND COPPER PRODUCTS FOR EXPORT DURING THE YEAR 1900

by Illinois Steel Co., Lorain Steel Co. (except from Johnstown Plant), American Steel & Wire Co., National Tube Co., American Bridge Co., and the National Steel Co.; also Carnegie Steel Co.'s Export Shipments of Rails and Sheet Bars.

	Gross Tons
Pig Iron	3,335
Scrap, Iron and Steel	380
Billets, Blooms, Slabs and Sheet Bars	129,246
Steel Rails	237,070
Wire Rods	26,890
Steel Bars, Hoops and Bands	1,108
Plates and Sheets	2,832
Structural Shapes and Work	7,061
Wire, Barbed	34,290
Wire, All Other	34,762
Wire Nails, Tacks, Staples and Spikes	31,933
Pipe, Tubes and Fittings	43,157
Sundry Iron and Steel Products	7,371
Total	559,435

2763
2764

Government Exhibit No. 438,

was marked for identification at page 6543 of Volume XVI of the printed record on October 7, 1913; but, not being introduced in evidence by the Government, it was later offered by the defendants and marked "Defendants' Exhibit (Ellis) No. 109, October 9, 1913."

Government Exhibit (Nason) No. 439-a,

October 8, 1913.

(Extract from pages 6-8 of pamphlet entitled "The Production of Iron Ore, Pig Iron, and Steel in 1912—United States Geological Survey.")

PRODUCTION OF IRON ORE BY STATES.

Iron ore was mined in 27 States in 1912, as well as in 1911. Of these States, four—Idaho, Montana, Nevada, and Utah—produced ores for fluxing only; part of Colorado's production was for fluxing and part for pig iron; Michigan produced a very small quantity for flux, and a small quantity was produced in Missouri for special fluxing use; the remaining States produced iron ore for blast-furnace use only.

The rank of the five States producing the largest quantity of iron ore—Minnesota, Michigan, Alabama, New York, and Wisconsin—remained unchanged in 1912, but there were a few changes in the relative rank of certain of the smaller producers. For instance, in 1911 Virginia ranked sixth and Pennsylvania seventh, but the rank of these two States was reversed in 1912. Likewise, the rank of New Jersey and Tennessee, respectively eighth and ninth in 1911, was reversed in 1912. The increase in quantity of ore mined in 1912 was made by the mines in the five States of largest production mentioned above; nearly all the other States showed a decrease.

MINNESOTA PRODUCED FIVE-EIGHTS OF TOTAL.

The Minnesota iron ranges are producing at present considerably more iron ore than is produced in all the rest of the States together, having furnished nearly 62.5 per cent. of the total for the United States in 1912. The Lake Superior district, comprising all the mines in Minnesota and Michigan and those in northern Wisconsin, mined 46,368,878 tons in 1912, or nearly 84.08 per cent. of the total.

Of the two following tables the first gives a comparison of the iron ore mined and marketed by States for 1911 and 1912, showing the rank of each State and the percentage of the total mined and marketed in the several States, and the second shows the quantity and value of the iron ore marketed in 1911 and 1912, by States, together with the increase or decrease in tonnage and the percentage of increase or decrease in the various States.

Government Exhibit (Nason) No. 439-b,

October 8, 1913.

(Extract from pages 9-10-11 of pamphlet entitled "The Production of Iron Ore, Pig Iron, and Steel in 1912—United States Geological Survey.")

PRODUCTION OF IRON ORE BY VARIETIES BY STATES AND MINING DISTRICTS.

Iron minerals are classified as sulphides, oxides, carbonates, silicates, etc., of which only the oxides and the carbonates are used in the iron and steel industry, except a very small quantity of by-product from sulphide ores used in acid manufacture. The ores of iron are generally classed under four heads:

1. Hematite.—Including all varieties of the anhydrous sesquioxid (Fe_2O_3—theoretical percentage of iron, 70). This is known locally as red hematite, specular ore, gray ore, fossil ore, oolitic ore, etc.

2. Brown ore.—Including hydrated sesquioxides, such as limonite, gothite, and turgite ($Fe_2O_3nH_2O$—theoretical percentage of iron, 59.8-66). This is known locally as brown iron ore, brown hematite, bog ore, limonite, etc.

3. Magnetite.—Including magnetic oxides (Fe_3O_4—theoretical percentage of iron, 72.4). Magnetite is known generally as magnetic iron ore.

4. Iron carbonate.—Including carbonates of various types ($FeCO_3$—theoretical percentage of iron 48.2). Iron carbonate is known locally as spathic iron ore, kidney ore, black band ore, siderite, etc.

Hematite has always been predominant as an ore of iron, and at present constitutes more than nine-tenths of the iron ore produced in the United States. Brown ore and magnetite are far below it in importance; brown ore furnishes at present less than 3 per cent., and magnetite a little less than 4 per cent. of the total iron-ore production. The production of iron carbonate is insignificant in comparison with that of the other ores; in 1912 it constitutes only about 0.02 per cent. of the total.

In the following tables are shown the quantities of each of the classes of iron ores mined in the various States and mining districts during 1911 and 1912.

Government Exhibit (Nason) No. 439-d,

October 8, 1913.

(Extract from pages 18-19-20 of pamphlet entitled "The Production of Iron Ore, Pig Iron, and Steel in 1912—United States Geological Survey.")

IRON-ORE INDUSTRY IN THE LAKE SUPERIOR DISTRICT.

Production of iron ore in the Lake Superior district, by ranges.—The Lake Superior district includes the Vermilion, Mesabi, Cuyuna, Penokee-Gogebic, Marquette, and Menominee ranges in the States of Minnesota, Michigan, and Wisconsin. The Menominee range includes the Crystal Falls, Metropolitan, Iron River, and Florence areas; the Marquette range includes the Republic and Swanzy areas. The Baraboo and Iron Ridge areas of southern Wisconsin and the Spring Valley area of northwestern Wisconsin are frequently also included in the Lake Superior district. In the first group of ranges the ore mined is almost entirely Algonkian hematite, belonging to the Huronian series. The Baraboo ore is of the same nature, but the Iron Ridge ore is "Clinton" hematite, and the Spring Valley ore is brown ore.

In addition to these ranges there are several iron-ore districts on the Canadian side of the Great Lakes, the principal ones of which are the Michipicoten, the Animikie, the Matawin, and the Atikokan.

The ranges in the United States which produced ore in 1912 were the Vermilion, Mesabi, Penokee-Gogebic, Marquette, Menominee, and Cuyuna, besides the Baraboo and Iron Ridge areas. Much development work was done on the Cuyuna range, which made its first shipments in 1911.

An analysis of reported production (quantity mined) in 1912, by ranges, in the Lake Superior district, shows that the Mesabi range mined 32,604,756 tons of iron ore, compared with 23,126,943 tons in 1911, an increase of 40.98 per cent.; the Menominee range 4,465,466 tons, compared with 4,062,778 tons in 1911, an increase of 9.91 per cent.; the Gogebic range 3,926,632 tons, compared with 3,099,197 tons in 1911, an increase of 26.7 per cent.; the Marquette range 3,545,012 tons, compared with 3,743,145 tons in 1911, a decrease of 5.29 per cent.; the Vermilion range 1,457,273 tons, compared with 1,336,938 tons in 1911, an increase of 9 per cent.; and the Cuyuna range, which in 1912 entered upon its second year as a shipper of ore, 369,739 tons, compared with 181,224 tons in 1911, an increase of 104.02 per cent.

The Mesabi range produced 70.32 per cent. of the entire Lake Superior output and more than 59 per cent. of the entire production of the United States. The Menominee, Penokee-Gogebic, and Marquette ranges are next in importance, the Menominee producing in 1912 a little less than the State of Alabama, which is the next State in importance as a producer after Minnesota and Michigan. The Vermilion range, the fifth in importance of the six producing Lake Superior ranges, produced more ore in 1912 than New York, which is fourth in importance as a producing State.

The following table shows the production of the first six of these ranges for 1911 and 1912, as they constitute the Lake Superior district proper:

2789

Government Exhibit (Catlett) No. 440,

October 16, 1913.

COPY.

Birmingham, Ala., Nov. 21, 1907.

Mr. James Gayley, 1st V. P.
New York, N. Y.

Dear Sir:

Our work in regard to the Red Ores, which represent the principal present and future supply of the "T. C. I." Company, has progressed far enough to permit us to form clear general impressions in regard to them. Mr. Merriam and myself are in substantial agreement in the matters; but in order that you may have the advantage of two view points we are writing separately.

I hand you herewith a Geological Survey topographic sheet on which is approximately located the holdings of the "T. C. I." Company on Red Mt. This boundary is in green. Adverse ownership in purple.

The outcrop is marked in orange, and the location, direction and length (in horizontal projection) of the several slopes is indicated by red dotted lines. While the red fossil ore, which forms the basis of the Alabama Iron industry outcrops for hundreds of miles in the State, and represents in the aggregate an enormous tonnage, with one or two isolated exceptions, it is only on Red Mt. that it reaches a thickness of 5 feet or more.

The cream of the district may be said to lie between Sparks Gap and Graces Gap (see Map). North of Graces Gap, while retaining its thickness it becomes more silicious. At or near Sparks Gap it becomes thinner and more disturbed. Of this outcrop distance of between 10 miles and 11 miles, the "T. C. I." owns 6.75 miles.

Within this distance it is a wonderful and magnificent body of ore.

The engineers' measurements of the ore as worked from Sparks Gap to Graces Gap show an average of 10 ft. with a

given full value to all of the land to the extreme boundary. But it must be borne in mind that this remote land carries the ore, assuming the same dip, at a depth of more than 8000 feet, and over 3 miles from the nearest point where it has been intersected.

If for the moment we confine our calculations to one mile in depth below the 6¾ miles of outcrop, with the average thickness of the present workings we would get about 155,000,000 tons, of which 16,000,000 tons have already been exhausted, leaving approximately 139,000,000 tons available above that limit. This is a reasonable and conservative assumption, though but a rough one.

The recent output from the red ore mines has been at the rate of approximately 1½ million tons a year. The slopes in operation averaging about 10,000 tons a month, and the maximum being 16,000 tons.

There are available about 10 million tons above the bottom of the present slopes.

It is slow and costly to drive the slope while operating, and the amount of working places is increased very slowly. If slopes are driven far enough ahead to provide working places to the capacity of the haulage it ought to be possible to get from each slope 20,000 tons a month. The total number of slopes can be increased, possibly to as many as 20. This presents a possibility of nearly 5 millions tons a year by this method. A great deal would have to be done before this is possible and a large amount of time consumed, as such development can only be done slowly, and it represents the extreme limit of this mode of attack. It is very important to bear this in mind for while this bed of ore is wonderful in its way it cannot be developed quickly by any method, nor is it possible to exhaust it quickly by any method.

No marked decrease may be expected in cost (80c to 85c) except from increased output or change in the general labor scale.

The quality of the ore cannot be economically be improved.

maximum of 14 ft. and a minimum of 7 ft. I have been able to substantially confirm these figures.

The dip varies from 40° at Sparks Gap to about 15° at Graces Gap.

I have examined the entire territory, taking sections from Red Mt. to Shades Mt. and there is no disturbance sufficient to make a well defined impression on the surface—There are two faults of moderate displacement which are encountered the one in slope No. 15 and the other in Potter No. 2, and which intersect the outcrop at a small angle. They do not appreciably affect the quality and thickness of the ore which is worked on either side.

I should expect the bed of ore to continue under the entire property with only such irregularities as would be found in what would be called a regular stratified bed, and the owner of the property might not improperly claim its existence and calculate tonnage on that assumption.

But even the most regular stratified deposits do change at times very suddenly, and if I were acting for a purchaser I should attach a much reduced value to anything beyond the limit of convenient working by the present slopes—say one mile from the outcrop.

1st Because of possibility of change of thickness.

2nd Because of possibility of change in quality.

3rd Because of necessary increase in the cost of winning the ore below that depth.

I have marked on the map in a yellow dotted line the projection of the bottom of the workings where they reach one mile from the outcrop; and also the vertical depth, approximately, below the surface.

Three drill holes have been put down; intersecting the bed at 2739, 1989 and 2411 ft., respectively, below the outcrop measured on the slope. Taken as a whole they indicate no definite change, either in thickness or quality from the ore in the corresponding slope. Additional holes could be put down with much profit.

In calculating tonnage the engineers of the company have

Government Exhibit (Assmann) No. 441,

October 27, 1913.

(Contract file.)

Memorandum of Agreement made and entered into this tenth (10th) day of October, A. D., 1910, by and between the Carnegie Steel Company of Pittsburgh, Pennsylvania, hereinafter called the Sellers, and the Standard Tin Plate Company of Canonsburg, Pennsylvania, hereinafter called the Buyers:

Quantity: Buyers hereby agree to purchase from Sellers and Sellers agree to furnish Buyers at prices hereinafter stipulated, and subject to the terms and conditions of this agreement, Buyers' entire requirements of Soft Bessemer Steel Sheet Bars between January 1st, 1911, and December 31st, 1911, not less than Two Thousand (2,000) gross tons nor more than Twenty-five Hundred (2,500) gross tons per month.

Material: Sellers' Standard Quality Soft Bessemer Steel Sheet Bars in long lengths of about Thirty (30) feet, of sizes within the capacity of Sellers' mills to produce, and as heretofore furnished by Sellers to Buyers.

Price: The price of Sheet Bars f. o. b. Canonsburg, Penn'a., delivered hereunder shall be fixed quarterly on or before the first (1st) day of the month beginning each quarter, and shall be based upon the average market price of Bessemer Steel Sheet Bars f. o. b. Pittsburg, Pa., as published in the Iron Age and Iron Trade Review weekly editions for the month next preceding the beginning of the quarter in which shipments are specified to be made. For example,—the market price of Bessemer Steel Sheet Bars, Pittsburg, Penn'a., as published in the

	Iron Age.	Average.	Iron Trade Review.	Average.
June 2nd. 1910	$26.50 to $27.00	$26.75		$27.00
June 9th, 1910	26.50 to 27.00	26.75	$26.50 to $27.00	26.75
June 16th, 1910	26.50 to 27.00	26.75	26.50 to 27.00	26.75
June 23rd, 1910	26.50 to 27.00	26.75	26.50 to 27.00	26.75
June 30th, 1910	26.50 to 27.00	26.75	26.50	26.50
Average for Month		$26.75		$26.75

Which Would Make the Price on Which to Base Sheet Bars for July, August and September, 1910, Shipments $26.75

The average analysis of slopes 7, 8, 9, 10, 11 and 12 for 1906 was

Metallic iron	35.96
Silica	12.19
Alumina	3.21
Lime	16.98
Moisture	.50 to .75

The "T. C. I." Co. undoubtedly has an enormous tonnage of limy red ore of good and uniform quality.

It is possible by pushing dead work, by the consumption of considerable time, and not excessive cost or change in the method of development—to increase the present capacity two or three times.

If a larger increase is demanded much time and a very large expenditure will be necessary and this should be preceded by exhaustive drill work.

The conditions surrounding winning the deposit give a disproportionate value to outcrop ore or that which can be easily reached.

It would certainly be desirable to control, on proper terms, the other properties on the outcrop from Graces Gap to Sparks Gap.

There conditions also make it proper to consider minor properties which can be developed rapidly, even if their tonnage is relatively small and the cost of operating relatively high.

I would earnestly recommend additional diamond drill work.

There is a possibility of concentrating the lean silicious ores north of Graces Gap which would give them additional value to what they have at present.

Very truly yours,
(Signed) CHARLES CATLETT.

under this agreement, Buyers agree to pay and Sellers agree to accept fifty cents (50c) per gross ton extra.

TERMS: Net cash within Thirty (30) days from date of invoice, payable in New York Exchange of other funds par in Pittsburg, Pennsylvania, with one-half (½) of One per cent. (1%) discount for settlement within Ten (10) days from date of invoice.

In case the Buyers shall fail to make payments in accordance with the terms and conditions of this agreement, further shipments may be deferred by Sellers until such payments are made, or Sellers may at its option terminate this agreement. Shipments and deliveries under this agreement shall at all times be subject to the approval of Sellers' Credit Department and in case Sellers shall have any doubt as to Buyers' responsibility, Sellers may decline to make any further shipments hereunder except upon receipt of satisfactory security or for cash before shipment.

PLACE OF DELIVERY: F. O. B. cars Buyers' Works, Canonsburg, Pennsylvania.

SHIPMENTS: Shipments are to be made as set forth in paragraph under "Quantity." Buyers to notify Sellers, in writing, on the Twentieth (20th) day of the month just preceding the beginning of each quarter the exact tonnage of Sheet Bars that will be required for shipment during each month of that quarter. For example, Buyers will notify Sellers on June 20th what their exact requirements will be for each month July, August and September; and on September 20th, their exact requirements for the months of October, November and December, and so on as long as this contract continues in force.

Fifty per cent. (50%) of all specifications for Sheet Bars are to be in Sellers' hands not later than the Tenth (10th) day of the month and the remaining Fifty per cent. (50%) by the Twentieth (20th) day of the month to cover all tonnage set up for delivery during that month.

ARBITRATION: Should any dispute arise between the parties to this agreement as to price of material or concerning the

From the market price as determined above special allowance is to be deducted in accordance with the following table to determine prices Buyers agree to pay for Sheet Bars under this agreement and Sellers agree to accept:

When said market price is $21.99 and under—no deduction is to be made;

When said market price is $22.00 to $22.99 inclusive—25¢ per gross ton;

When said market price is $23.00 to $23.99 inclusive—50¢ per gross ton;

When said market price is $24.00 to $24.99 inclusive—50¢ per gross ton;

When said market price is $25.00 to $25.99 inclusive—87½¢ per gross ton;

When said market price is $26.00 to $26.99 inclusive—87½¢ per gross ton;

When said market price is $27.00 to $27.99 inclusive—$1.00 per gross ton;

When said market price is $28.00 to $28.99 inclusive—$1.00 per gross ton;

When said market price is $29.00 to $29.99 and over—$1.25 per gross ton:

For example,—when the monthly market price as determined above from the Iron Age and Iron Trade Review is $26.75 per gross ton, Buyers agree to pay and Sellers agree to accept $25.875 per gross ton for Sellers' Standard Quality Soft Bessemer Steel Sheet Bars for the following quarter.

The price determined as above is to be submitted by Sellers to Buyers on or before the first (1st) day of the month beginning each quarter, and Buyers are to acknowledge their acceptance of such price within the ensuing three (3) days.

In case any orders for Sheet Bars remain unshipped at the end of the quarter in which said Sheet Bars are specified to be shipped, such Sheet Bars shall be delivered during the next succeeding quarter or quarters at the price for the quarter in which said Sheet Bars were specified for delivery.

For any Sheet Bars cut to specified short lengths furnished shall be as effective and binding as if made by or to the Sellers.

THIS AGREEMENT shall take effect on the first (1st) day of January, 1911, and continue thereafter in full force and effect during and until the 31st day of December, 1912, except that either party may have the privilege of terminating the agreement on December 31st, 1911, by giving written notice to that effect on or before October 1st, 1911.

IT IS MUTUALLY COVENANTED AND AGREED that this agreement and all its terms and provisions shall inure to the benefit and be binding upon the parties hereto, their respective successors and assigns.

IN WITNESS WHEREOF, the respective parties hereto have duly executed this agreement the day and year first above written.

Attest: CARNEGIE STEEL COMPANY,
(Sgd.) H. C. SMITH. (Sgd.) W. D. SIEBERT,
Assistant General Manager of Sales.

Attest: STANDARD TIN PLATE COMPANY,
(Sgd.) H. C. SMITH. (Sgd.) LOUIS FOLLET,
V. Pres't.

obligations or rights of either of them, the same shall be referred to a Board of Arbitrators to consist of Three (3) members to be chosen as follows, viz.: Buyers shall select one arbitrator and Sellers shall select one arbitrator. The two arbitrators so chosen shall select the third. If either Buyers or Sellers shall fail to appoint their arbitrator within Ten (10) days after the party desiring arbitration has appointed its arbitrator and given notice to the other of such appointment and of the matter proposed to be arbitrated, then the arbitrator so appointed shall appoint for the defaulting party, and both arbitrators shall appoint the third as above provided, and said Board so appointed shall hear and decide the dispute. The decision of said arbitrators, or that of a majority of them, shall be final and conclusive between the parties upon all matters concerning which said arbitration is demanded.

REMARKS: Sheet Bars are sold by Sellers hereunder upon the conditon that Buyers shall not resell any of said Sheet Bars without first putting same through a process of manufacture at its works, and any failure on the part of Buyers to comply with said condition, shall, at the option of Sellers, be sufficient cause for immediate cancellation or termination of this contract.

Strikes, differences with workmen, or any other contingency beyond the control of the respective parties hereto shall be sufficient excuse to either party for failure to make or accept deliveries under this contract during the continuance of such contingency, but upon its removal, deliveries under this contract shall be resumed without any extension of expiration date by reason of such suspension.

Sellers are hereby given the right to have any Company in which the United States Steel Corporation is interested as stockholder or otherwise furnish material of the same kind and quality at the same cost to Buyers, in whole or part performance of this contract, and it is agreed that shipments and billing of material by or in the name of such Company, as well as any payments made to such Company therefor,

Yours truly,
CARNEGIE STEEL COMPANY,
W. P. SIEBERT,
Assistant General Manager of Sales.

ACCEPTED:
STANDARD TIN PLATE COMPANY:
LOUIS FOLLET.
V. P.

MEMORANDUM OF AGREEMENT made and entered into this Thirty-first (31st) day of October, A. D., 1911, by and between the CARNEGIE STEEL COMPANY of Pittsburgh, Penna., hereinafter called the Seller, and the STANDARD TIN PLATE COMPANY of Canonsburg, Penna., hereinafter called the Buyer.

QUANTITY: Buyer hereby agrees to purchase from Seller and Seller agrees to furnish Buyer, subject to the conditions of this agreement, Buyer's entire requirements from January 1st, 1912, to and including December 31st, 1912, and thereafter unless terminated by either party giving Sixty (60) days written notice which notice may be given on or after November 1st, 1912, not to exceed Forty Thousand (40,000) gross tons not be less than Twenty-five Thousand (25,000) gross tons during any one year; and not to exceed Ten Thousand (10,000) gross tons nor be less than Six Thousand Two Hundred and Fifty (6,250) gross tons during any one quarter; and not to exceed Three Thousand Three Hundred and Thirty-three (3,333) gross tons nor be less than Two Thousand and Eighty-three (2,083) gross tons during any one month.

MATERIAL: Seller's standard quality soft Bessemer and Open Hearth Steel Sheet Bars in long lengths of about Thirty (30) feet, of sizes within the capacity of Seller's mills to produce, and as heretofore furnished by Seller to Buyer.

PRICES: BESSEMER: The price of soft Bessemer Steel Sheet Bars in mill lengths of about Thirty (30) feet f. o. b. Canonsburg, Penna., delivered hereunder shall be submitted by Seller to Buyer quarterly on the last Thursday of the money (*sic*) next preceding the beginning of each quarter, and shall

Government Exhibit (Assmann) No. 442,

October 27, 1913.

CARNEGIE STEEL COMPANY,
General Offices; Carnegie Building,

Pittsburg, Pa.,
September 30th, 1912.

H. P. Bope,
First Vice President and General Manager of Sales.
W. P. Siebert,
Asst. Gen'l. Manager of Sales.
Standard Tin Plate Company,
Canonsburg, Pennsylvania.

Gentlemen:

Referring to agreement between us dated October 31st, 1911, for Sheet Bars, we confirm arrangement between your Mr. Follet and the writer on Saturday last, that this agreement is extended to December 31st, 1913, and to be in full force and effect in all its terms and conditions until that date.

It is further understood, in order to assist you to meet unusual conditions in the Tin Plate business and not to establish any precedent under the agreement, that we have now fixed the price on 5000 gross tons of Bessemer Sheet Bars for delivery in about equal monthly quantities during January and Feb. next, at the same price as established under the agreement for this quarter, viz—$23.19 per gross ton F. O. B. cars, your works, Canonsburg, Penna., instead of the price which would be determined under the agreement and submitted on the last Thursday of December next. For the remainder of the tonnage you will require during the first quarter of next year, you are to pay us the regular price as provided for in the contract.

This letter is being written you in duplicate, and we would thank you to kindly sign and return one copy to us as promptly as possible so the matter may be made one of record, and oblige.

Penna., delivered hereunder shall be submitted by Seller to Buyer quarterly on the last Thursday of the month next preceding the beginning of each quarter, and shall be based upon the then ruling market price of Open Hearth Steel Sheet Bars f. o. b. cars, Canonsburg, Penna.

Buyer shall either accept or decline the prices submitted as provided hereinbefore within Three (3) days after such prices are submitted.

In the event of the refusal of Buyer to accept the price of Open Hearth Steel Sheet Bars thus submitted, upon submitting satisfactory evidence to the Seller of lower prices, Seller shall have the privilege of either meeting such lower prices for Open Hearth Steel Sheet Bars or permitting Buyer to purchase elsewhere for that quarter's delivery of Open Hearth Steel Sheet Bars.

In case any orders for Sheet Bars remain unshipped at the end of the quarter in which said Sheet Bars are specified to be shipped, such Sheet Bars shall be delivered during the next succeeding quarter or quarters at the price for the quarter in which said Sheet Bars were specified for delivery.

For any Sheet Bars cut to specified short lengths furnished under this agreement, Buyer agrees to pay and Seller agrees to accept Fifty Cents (50c) per gross ton extra.

TERMS: Net cash within Thirty (30) days from date of invoice, payable in New York Exchange or other funds par in Pittsburgh, Penna., with one-half (½) of one per cent. (1%) discount for settlement within Ten (10) days from date of invoice.

In case Buyer shall fail to make payments in accordance with the terms and conditions of this agreement, further shipments may be deferred by Seller until such payments are made, or Seller may at its option terminate this agreement.

Shipments and deliveries under this agreement shall at all times be subject to the approval of Seller's Credit Department, and in case Seller shall have any doubt as to Buyer's responsibility, Seller may decline to make any further shipments hereunder except upon receipt of satisfactory security or for cash before shipment.

be based upon the average market price of Bessemer Steel Sheet Bars f. o. b. Pittsburgh, Penna., as published in the Iron Age and Iron Trade Review weekly editions for the month next preceding the beginning of the quarter in which shipments are specified to be made. For example,—the market price of Bessemer Steel Sheet Bars f. o. b. Pittsburgh, Penna., as published in the

Date.	Iron Age.	Average.	Iron Trade Review.	Average.
June 2nd, 1910	$26.50 to $27.00	$26.75	$27.00	$27.00
June 9th, 1910	26.50 to 27.00	26.75	$26.50 to 27.00	26.75
June 16th, 1910	26.50 to 27.00	26.75	26.50 to 27.00	26.75
June 23rd, 1910	26.50 to 27.00	26.75	26.50 to 27.00	26.75
June 30th, 1910	26.50 to 27.00	26.75	26.50	26.50
AVERAGE FOR MONTH		$26.75		$26.75
WHICH WOULD MAKE THE PRICE ON WHICH TO BASE BESSEMER STEEL SHEET BARS FOR JULY, AUGUST, AND SEPTEMBER, 1910, QUOTAS				$26.75

From the market price as determined above, special allowance shall be deducted in accordance with the following table to determine prices Buyer agrees to pay Seller for Bessemer Steel Sheet Bars furnished under this agreement:

When the market price of Bessemer Steel Sheet Bars per gross ton f. o. b. Pittsburgh, Penna., is—		An allowance per gross ton shall be made of—
$19.99 or Under		No allowance
20.00 to and including	$20.99	$0.25
21.00 to and including	21.99	0.50
22.00 to and including	23.99	0.75
24.00 to and including	24.99	1.00
25.00 to and including	26.99	1.25
27.00 to and including	28.99	1.50
29.00 or Over		1.75

For example,—when the monthly market price as determined above from the Iron Age and Iron Trade Review is $26.75 per gross ton, Buyer agrees to pay and Seller agrees to accept $25.50 per gross ton for Seller's standard quality soft Bessemer Steel Sheet Bars f. o. b. cars, Canonsburg, Penna., specified for shipment during the quarter including July, August, and September, 1910.

OPEN HEARTH: The price of Open Hearth Steel Sheet Bars in mill lengths of about Thirty (30) feet f. o. b. Canonsburg, REMARKS: Sheet Bars are sold by Seller hereunder upon the condition that Buyer shall not resell any of said Sheet Bars without first putting same through a process of manufacture at its Works, and any failure on the part of Buyer to comply with said condition, shall, at the option of Seller, be sufficient cause for immediate cancellation or termination of this contract.

Strikes, differences with workmen, or any other contingency beyond the control of the respective parties hereto shall be sufficient excuse to either party for failure to make or accept deliveries under this contract during the continuance of such contingency, but upon its removal, deliveries under this contract shall be resumed without any extension of expiration date by reason of such suspension.

Seller is hereby given the right to have any Company in which the United States Steel Corporation is interested as stockholder or otherwise furnish material of the same kind and quality at the same cost to Buyer, in whole or part performance of this contract, and it is agreed that shipments and billing of material by or in the name of such Company, as well as any payments made to such Company therefor, shall be as effective and binding as if made by or to the Seller.

IT IS MUTUALLY COVENANTED AND AGREED that this agreement and all its terms and provisions shall inure to the benefit of and be binding upon the parties hereto, their respective successors and assigns.

IN WITNESS WHEREOF, the respective parties hereto have duly executed this agreement the day and year first above written.

ATTEST: CARNEGIE STEEL COMPANY,
L. C. LUSTENBERGER. W. P. SIEBERT,
Assistant General Manager of Sales.

ATTEST: STANDARD TIN PLATE COMPANY,
BYARD W. BENNETT. LOUIS FOLLET,
V. Pres't.

Place of Delivery: F. O. B. cars, Buyer's Works, Canonsburg, Penna.

Shipments: Shipments shall be made as set forth in paragraph under "Quantity."

Buyer shall notify Seller, in writing, on the Twentieth (20th) day of the month just preceding the beginning of each quarter the exact tonnage of Sheet.

Bars that will be required for shipment during each month of that quarter. For example, Buyer shall notify Seller on December 20th, 1911, what their exact requirements will be for each month, January, February, and March, 1912, and on March 20th, 1912, what their exact requirements will be for each month, April, May, and June, 1912, and so on as long as this contract continues in force.

Fifty per cent. (50%) of all specifications for Sheet Bars shall be in Seller's hands not later than the Tenth (10th) day of the month and the remaining Fifty per cent. (50%) by the Twentieth (20th) day of the month to cover all tonnage set up for delivery during that month.

Arbitration: Should any dispute arise between the parties to this agreement as to the price of material or concerning the obligations or rights of either of them, the same shall be referred to a Board of Arbitrators to consist of Three (3) members to be chosen as follows, viz: Buyer shall select one arbitrator and Seller shall select one arbitrator. The two arbitrators so chosen shall select the third. If either Buyer or Seller shall fail to appoint its arbitrator within Ten (10) days after the party desiring arbitration has appointed its arbitrator and given notice to the other of such appointment and of the matter proposed to be arbitrated, then the arbitrator so appointed shall appoint for the defaulting party, and both arbitrators shall appoint the third as above provided, and said Board so appointed shall hear and decide the dispute. The decision of said arbitrators, or that of a majority of them, shall be final and conclusive between the parties upon all matters concerning which said arbitration is demanded.

All billets to be sheared within 2% above or below specified weights; short pieces 20″ and up to be included up to 5% of the shipment, and all billets to be free from flaws and imperfections.

Analysis of both Bessemer and Basic Open Hearth Steel to be same as now supplied by seller to buyer in either soft steel or high carbons. Open hearth Steel not to exceed .04 in phosphorus and sulphur, and all material to be of seller's usual quality and finish.

Present understanding in regard to buyer's acceptance of off heats to govern, which is that in high carbon steel, the carbon is not to vary more than .05 above or below carbon specified, but buyer agrees to accept at price of high carbon steel all off heats which do not vary more than .10 in carbon above or below carbon specified, providing such off heats do not exceed 5% of total amount shipped. Buyer also agrees to accept at soft steel price, additional off heats which do not exceed 1.20 carbon or vary more than .15 carbon below carbon specified, providing such additional off heats do not exceed 5% of total amount shipped on contract.

Time of Delivery: To be in about equal monthly quantities during last six months of 1901.

Place of Delivery: F. O. B. cars Detroit, Mich.

Freight: Cash.

Price:

			Per gross ton of
Bessemer Steel Billets up to and inc.	.20 carbon	$25.00	2240#
“ “ “	.21 to .75 “	26.00	“
“ “ “	.76 to 1.10 “	27.00	“
Basic Open Hearth “ up to and inc.	.75* .~~20~~ carbon	27.00	“
“ “ “ “	.76* .~~21~~ to 1.10 “	28.00	“

(Red ink memorandum:) * See my letter Apl 23

Their answer Apl 26 hereto attached—

(Pencil memorandum:) See letter 9/24/01—W D L

Government Exhibits (Morton W. Reed) Nos. 443-468,

October 20, 1913.

Pursuant to agreement of counsel at page 7714 of Volume XIX of the printed record, the above 26 exhibits are to appear only in the typewritten volume of Government Exhibits, and are not to be printed unless requested by counsel on either side.

Government Exhibit (Inman) No. 469,

November 14, 1913.

(Ink memorandum:) W. P. S. bets D. W. L. 1 box of Bock cigars that price for this same material for same deliveries will not be $1.00 per ton less than this before Dec 31/01.

D. W. L.
W. P. S.

NATIONAL STEEL COMPANY
of New Jersey.
MEMORANDUM OF SALE.

New York, N. Y., April 22d, 1901.

NATIONAL STEEL COMPANY, of New Jersey agrees to sell and DETROIT STEEL & SPRING Co., of Detroit, Mich., agree to buy

QUANTITY: Buyer's entire requirements from July 1st, 1901, to December 31st, 1901, not to be less than Fifteen Thousand (15,000) nor to exceed Twenty-one Thousand (21,000) gross tons.

MATERIAL: Bessemer and Basic Open Hearth Steel, not exceeding 4500 tons to be basic O. H. Steel.

SPECIFICATIONS: Billets 3⅞ x 3⅞″ square and not to exceed 4″ x 4″ square at sheared ends, cut to specified weights from 90 lbs. to 250 lbs.

in the contract. It was distinctly understood and agreed however, that this concession was made you only because of our inability to give you as much High Carbon Bessemer as you seem to require, and it must be understood that you shall take all the High Carbon Bessemer at the Contract price of same, if we are able to increase deliveries in excess of 325 tons per week.

Be good enough to acknowledge receipt of this letter.

Yours truly,
N. D. CARPENTER.

(Pencil memorandum:) Deduct 50¢ ton on *all O H* shipped Sept 20th or after *D W L* *Attach to contract.*

Government Exhibit (Inman) No. 470,

November 14, 1913.

AGREEMENT made between the CARNEGIE STEEL COMPANY and the RAILWAY STEEL-SPRING COMPANY, July 28th, 1904.

The Carnegie Steel Company agrees to sell to Railway Steel-Spring Company such billets and spring bar steel as the Railway Steel-Spring Company may order from them between July 1st, 1904, and July 1st, 1905, at the following prices:

Open Hearth billets, high carbon, $22. a gross ton.

Open Hearth billets, low carbon, $20. a gross ton.

Bessemer billets, low carbon, $20. a gross ton.

All in accordance with annexed specifications. Flat, round, and square spring steel bars, blunt (The words "all sizes" are here inserted in ink over a caret), (P. R. R. analysis and in accordance with specifications hereto annexed) $1.40 per hundred pounds; tapering $2. per net ton extra.

The Carnegie Steel Company agrees to deliver billets at said prices, freight prepaid, at the Detroit plant of Railway Steel-Spring Company, and to deliver spring bar steel at the above price, freight prepaid, at any of the plants belonging to Railway Steel-Spring Company which that Company shall designate.

TERMS: Net cash against sight draft B/L attached less ½ of 1%.

Strikes, differences with workmen, accidents to machinery, or other contingencies beyond the control of the seller, shall be sufficient excuse for any delay due to such causes.

Each month's delivery is to be treated as a separate contract, independent of the deliveries of other months.

Seller gives Buyer the privilege of canceling any one month's delivery if such delivery is delayed more than thirty days beyond the expiration of the month in question, provided buyers notify seller within ten days after the expiration of said thirty days' delay of their desire to cancel. If not canceled within that time, it is understood that shipment will be made as soon as reasonably possible after the cause of the delay has been removed. All specifications are to be sent by buyers at least ten days before the time fixed for shipment.

NATIONAL STEEL COMPANY,
By HENRY WICK President

DETROIT STEEL & SPRING CO
By DEWITT LOOMIS V P & G M

NATIONAL STEEL COMPANY,
Sales Office; 122, Griswold Street.

N. D. CARPENTER,
Manager of Sales.

Detroit, September 24th, 1901.

The Detroit Steel & Spring Company,
Detroit, Mich.

Gentlemen:—

Referring to conversation between your Mr. Loomis and our Pittsburg office on Saturday last, regarding delivery of High Carbon Billets on your Contract with the National Steel Co., we beg to confirm the agreement, that in order to give you 650 tons of High Carbon Steel per week we will reduce the price of Open Hearth material 50¢ per ton, making it $27.50. instead of $28.00, delivered Detroit, as provided for

BILLET SPECIFICATIONS.

HIGH CARBON O. H.

Carbon	.90 to 1.10
Phosphorus not over	.04
Manganese “ “	.45
Sulphur “ “	.04

LOW CARBON O. H.

Carbon about	.10 but not over .12
Phosphorus not over	.04
Manganese “ “	.45
Sulphur “ “	.04

H. P. B.
1st V P
7/28/04

RAILWAY STEEL-SPRING CO.
W. H. SILVERTHORN
V. Presdt.
July 28th, 1904.

RAILWAY STEEL-SPRING COMPANY

No. 1.

SPECIFICATIONS FOR SPRING STEEL.

No. 1. Spring Steel delivered under these specifications shall be free from physical defects, such as seams, cracks, pipes, etc.

No. 2. The diameter of round bars or the side of square bars shall not vary more than .01 of an inch, and must conform to the lengths and weights prescribed on orders.

No. 3. The width of the flat bars must not vary more than .03 of an inch, or the thickness more than .01 of an inch from the sizes ordered.

No. 4. On receipt of a shipment of steel, one or more bars will be selected for chemical analysis. The sample of borings will be taken from the part of the bar most convenient, except that no sample will be taken from the reheated

The Carnegie Steel Company further agrees that if the Railway Steel-Spring Company makes any contract prior to July 1st, 1905, for the manufacture or sale of steel springs, the Carnegie Steel Company, for twelve months after the date of that contract, will furnish it with all spring bar steel required by it to fill such contract, at the above rate, unless at the time of the making of such contract the price of billets has advanced $3. per ton over the present market price of $24.25 Detroit, in which case the Steel Company will not be required to furnish spring bar steel at the above price except during the twelve months covered by this agreement, but shall have the option of furnishing such additional bar steel as shall be required on such contracts at such higher price as shall be mutually agreed on at the time of making said contracts.

In consideration of the above agreements Railway Steel-Spring Company agrees to purchase from the Carnegie Steel Company not less than fifteen thousand tons of steel during the year covered by this contract.

The terms of payment shall be thirty days net, with one-half of one per cent. discount for cash within ten days from the date of invoice.

It Is Understood that Railway Steel-Spring Company will specify its requirements as far in advance as possible, and that the Carnegie Steel Company shall make deliveries with such promptness as shall cause Railway Steel-Spring Company no inconvenience in deliveries to its customers.

Carnegie Steel Company
H. P. Bope
1st Vice Prest.
Railway Steel-Spring Co.
W. H. Silverthorn
V. Presdt.

Broadway, New York, N. Y., hereinafter called the Buyers, agree to buy, Basic Open Hearth Steel Billets, upon the following terms and conditions, to wit:

QUANTITY: Buyers' entire requirements yearly of High and Low Carbon Basic Open Hearth Steel Billets, 4″ square, not exceeding Forty-eight thousand (48,000) gross tons each year; Buyers to notify Sellers in writing on the first day of each month the tonnage each of high carbon and low carbon billets that will be required for their operations during the following month; for example, notice would be given on the first day of July of the Buyers' requirements for the month of August and so on in like manner for each succeeding month during the contract period; and the tonnage so to be taken during each month always to be based upon the actual requirements of the Buyers for such period.

In case the Buyers should require for their operations during any one year a tonnage exceeding Forty-eight thousand (48,000) gross tons, or more than Twelve thousand (12,000) gross tons during any one quarter, or more than Four thousand (4,000) gross tons during any one month, the Sellers have the option of furnishing such additional tonnage at the price fixed for the quarter within which the additional tonnage, or any part thereof, is specified for shipment, and for which specifications are given according to the contract provisions.

MATERIAL: Sellers' standard grade of good merchantable Basic Open Hearth Steel Billets 4″ square, in cuts of 100# or over and billets over 4″ square of such sizes as Sellers are prepared to furnish in cuts of not less than 24″ long. High carbon billets, carbon .90 to 1.10, with phosphorus and sulphur each not over .04 and manganese not over .40; low carbon billets, carbon .10 but not over .12, phosphorus and sulphur each not over .04 and manganese not over .45.

PRICE: The price f. o. b. cars Buyers' Works, Detroit, Michigan, contemplated under this agreement for low carbon open hearth steel billets, as above, shall be fixed for each three months' period beginning with the third quarter, July 1st, 1905, and shall be determined according to the table given ends of tapered bars. All chemical analysis will be made in accordance with the standard methods of the Railway Steel-Spring Company.

No. 5. The metal required is of the following composition:

FLAT BARS.

Carbon	....	0.90 to 1.05 per cent.
Manganese, not over		.45 " "
Phosphorus	"	.05 " "
Silicon	"	.10 " "
Sulphur	"	.03 " "
Copper	"	.05 " "

ROUND AND SQUARE BARS.

Carbon	....	1.00 to 1.15 per cent.
Manganese, not over		.45 " "
Phosphorus	"	.05 " "
Silicon	"	.10 " "
Sulphur	"	.03 " "

No. 6. All rejected material will be returned at expense of shipper.

RAILWAY STEEL-SPRING COMPANY,
FRANK S. LAYNG, V. P.

General Office, New York, March 14, 1902.

RAILWAY STEEL-SPRING CO.
W. H. SILVERTHORN
V. Presdt.

July 28th, 1904.

H. P. B.
1st V P
7/28/04

Government Exhibit (Inman) No. 471,

November 14, 1913.

Pittsburg, Penna., July 13, 1905.

MEMORANDUM OF AGREEMENT, whereby the CARNEGIE STEEL COMPANY, Pittsburg, Penna., hereinafter called the Sellers, agree to sell, and the RAILWAY STEEL-SPRING COMPANY, No. 71

To the price so ascertained, according to the foregoing table for low carbon billets, shall be added an extra Two Dollars ($2.00) per gross ton for high carbon billets .90 to 1.10 carbon.

Terms: Net cash within thirty (30) days from date of shipment, with the privilege to Buyers of ½ to 1% discount for cash within ten days from date of invoice, payable in New York Exchange or other funds par in Pittsburgh, Penna.

Point of Delivery: Buyers' Works, Detroit, Michigan, f. o. b. cars in carload lots.

Shipment: In about equal monthly quantities during each year, but not exceeding four thousand gross tons in any one month; Buyers to give specifications to Sellers for the total tonnage required for delivery in any one month at least twenty (20) days before shipment is required.

Duration of Contract: It is mutually understood and agreed by the parties hereto that this agreement shall cover a period of eighteen (18) months, from July 1st, 1905, to December 31st, 1906, and thereafter unless terminated by either party giving six months' written notice to that effect, which notice may be given on or before June 30th or December 31st of any year from and including the year 1906, to become effective as of those dates.

Remarks: It is mutually understood and agreed that the Buyers shall have the right to order on account of this contract an equivalent grade of Bessemer steel, high and low carbon to specifications within the capacity of Sellers to furnish, at the corresponding prices for high and low carbon Open Hearth Steel, but such Bessemer steel always to take the place of and cancel an equivalent tonnage of Open Hearth steel.

The Sellers are hereby given the right to have any Constituent Company of the United States Steel Corporation furnish material of the same kind and quality, at the same cost to purchasers, in whole or part performance of this contract, and it is agreed that shipment and billing of the mahereafter, from the average price f. o. b. Pittsburg, Penna., of Standard Bessemer Pig Iron for the next preceding three months. The average selling price of Standard Bessemer Pig Iron f. o. b. cars Pittsburg, Penna., shall be agreed upon within one week from the end of each month, and the average price for the three months, within one week from the end of the third month.

In case the parties hereto cannot agree upon the average price of pig iron, it shall be referred to Mr. Albert H. Childs of Pittsburg, as arbitrator, and it is also mutually agreed that any other differences arising under this contract shall be referred to the said Albert H. Childs, whose decision shall be final and binding upon both parties. In case of the inability of the said Albert H. Childs to act as arbitrator, each of the parties to this agreement shall select a person of experience in the iron and steel trade to act in his stead, and their decision shall be final and binding upon both parties, and in case of their failure to agree, the two persons thus selected shall select a third person of experience in the iron and steel trade, and in such case the decision of two of the arbitrators shall be final and binding upon both parties.

When the average price of Pig Iron is:	The amount to be added to the price of Pig Iron shall be:
$10.99 and under	$5.75
11.00 to $11.99	6.00
12.00 to 12.99	6.25
13.00 to 13.99	6.50
14.00 to 14.99	6.75
15.00 to 15.99	7.00
16.00 to 16.99	7.25
17.00 to 17.99	7.50
18.00 and over	7.75

It is understood and agreed that for the purposes of this contract, the price of Pig Iron shall at no time exceed Nineteen Dollars ($19.00).

CARNEGIE STEEL COMPANY
General Offices; Carnegie Building,

Pittsburg, Pa., Dec. 17th, 1906.

Samuel A. Benner,
General Manager of Sales.
William P. Siebert,
Ass't Gen'l Manager of Sales.
W. H. Silverthorn, Vice-President,
Railway Steel Spring Company,
New York, N. Y.

Dear Sir:

Following the provisions of our contract with you of July 13th, 1905, covering your entire requirements of high and low Carbon Basic Open Hearth steel billets for a period of eighteen months from July 1st, 1905, to December 31st, 1906, and thereafter, under the conditions recited, please be advised that we shall cancel or terminate said contract on June 30th, 1907.

Your acceptance and return of one copy of this letter, will be sufficient acknowledgment.

Yours truly,
Carnegie Steel Company,
W. P. Siebert
Ass't. General Manager of Sales

Accepted
Railway Steel-Spring Co.
H. Inman
Asst. Genl. Supt.

12/18/06

terial by or in the name of such Constituent Company, as well as any payment made to such Constituent Company therefor, shall be as effective and binding as if made by or to the CARNEGIE STEEL COMPANY direct.

Strikes, differences with workmen, or other contingencies beyond the control of the respective parties hereto shall be sufficient excuse to either party for failure to make or accept deliveries under this contract during the continuance of such contingency, but upon its removal, this contract shall be resumed without any extension of time by reason of such suspension.

It is made a condition of this contract that the Buyers shall not re-sell any of the material furnished hereunder, or to be furnished, without first having put the same through a process of manufacture at their works.

IN WITNESS WHEREOF, the parties hereto have signed this contract in duplicate the day and year first above written.

CARNEGIE STEEL COMPANY,
H. P. BOPE
1st Vice Pres't.

ACCEPTED:
RAILWAY STEEL-SPRING CO.
W. H. SILVERTHORN
Vice Presdt

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